May 1992 Issue #10

Radio Fun

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"The beginner's guide to the exciting world of amateur radio."

in this issue

features

review

departments

ARRL and W5YI Petition to Bring Novice Testing into VE Program

In coordinated filings, both the American Radio Relay League and the Volunteer Examination Coordinator operation run by newsletter publisher Fred Maia W5YI have filed very similar petitions with the FCC that would, if granted, require that all Novice class amateur radio license examinations be administered under the current Volunteer Examiner program.

The petitions suggest that such a requirement would provide smoother and quicker processing of new Novice licenses and would help to maintain the integrity of the examination process for the entire range of amateur examinations from Novice through Amateur Extra class.

The Novice examination system, presently administered by two General class or higher licensees who are not necessarily certified as volunteer examiners, was not included in the original volunteer examiner program begun in 1984 to avoid overburdening the new program and because a volunteer examiner system for Novice examinations was already in place. The major difference between the League's and W5YI's requests is that the Maia application addresses the subject of fees for reimbursement of out-of-pocket costs of VECs and their VE teams while the ARRL filing does not broach the subject. The League's position would seem to indicate that the organization would be willing to perform testing for Novices without charging any fees. W5YI says, though, that if fees are not approved, his organization would still be willing to test applicants for the Novice at no cost.

The VEC testing program was created in 1983 as part of Public Law 259. The Congressional act, spearheaded by Senator Barry M. Goldwater K7UGA, was designed to take the financial burden off the FCC in the areas of amateur radio testing and the self-regulation of the service. This second section of the law eventually led to the creation of the joint FCC-ARRL Amateur Auxiliary.

The enabling legislation permitting the collection of fees for reimbursement of actual expenses (a VEC may not profit from administering examinations) followed a year later when Senator Goldwater asked Congress for this authority. During K7UGA's presentation before Congress, he stressed his desire that no fees ever be charged for the testing of Novice applicants, but this provision was never included in the actual language of the law.

Quick action by the Commission is expected and Rule Making numbers should be assigned to these two petitions shortly. *TNX Westlink Report Number 621, March 13, 1992.*

Radio Fun Moves to New Offices

There have been lots of changes afoot at *Radio Fun.*

Our parent company, Out To Launch, Inc., has been changed to Wayne Green, Inc. At the same time, *73 Amateur Radio Today*, which was held under a seperate corporation but housed in the same offices, has also been incorporated under Wayne Green, Inc. This corporate shuffle is a result of company president Wayne Green's (W2NSD) selling some of the assets of his former company, WGE, Inc, to International Data Group, Inc. for an undisclosed sum.

While all of this corporate intrigue may be fascinating to Wall St. types, the bottom line to readers of *Radio Fun* is the new address and phone numbers. You may reach the editorial offices of *Radio Fun* at (603) 924-0058, fax (603) 924-9327. The subscription order number, 1-800-257-2346, remains the same, but the ad sales number has been changed to 1-800-274-7373. The new BBS number is (603) 924-9343.

All correspondence may be addressed to *Radio Fun*, 70 Route 202-N, Peterborough NH 03458.

Dayton ARC 1992 Ham of the Year

For a lifetime devoted to serving the needs of radio amateurs worldwide, International Amateur Radio Union President Richard Baldwin W1RU has been named by the Dayton Amateur Radio Association to receive the organization's 1992 Radio Amateur of the Year award. Baldwin was chosen from among several nominations based on his exemplary work in helping to preserve the amateur spectrum through IARU participation within the framework of several World Administrative Radio Conferences, and other IARU activities. Baldwin is generally credited with being the driving force who obtained for amateur radio the three WARC bands at 10, 18, and 24 MHz at WARC '79 and is given credit for getting Albania on the air in 1991.

For his work in helping to unite a Cambodian family through amateur radio, Edward Raub Jr. W1RAN has been given the 1992 DARA Specific Achievement Award. Raub is credited with rescuing Cambodian amateur Piseth Keo from a refugee camp on the Thai-Cambodian border and reuniting Keo with his family in the United States. His achievement is documented in the March 1992 issue of *Readers Digest.*

The 1992 Technical Achievement award goes to Gerald S. Cromer K4NHN, an active ATVer, for his development of the Rib-Cage Slot antenna.

TNX N8EYW, N8ZM, Newsline and Westlink Report #622.

Amateur Radio at Crotched Mountain

The Crotched Mountain Rehabilitation Center Amateur Radio Club (CMARC) is now quite a success story. Just over a year ago Chris Edscorn NØCUH, a teacher's aide at the preparatory school, approached the center with the idea of forming the radio club to help complement the social and educational life of the young people living there.

Currently, there are four club meetings on Wednesdays, a Novice/Tech class on Thursdays, Saturday workdays and monthly Advisory Committee meetings.

The Crotched Mountain Rehabilitation Center is a fully licensed and accredited private non-profit preparatory school and rehabilitation facility serving physically and intellectually challenged children and young adults. The Crotched Mountain School has about 100 students ranging in age from 7 to 22.

Several students are currently working on their amateur radio licensing requirements. Their first licensed operator is Gabe Mouradjian. Gabe worked very hard to pass his No-Code Technician exam and is now diligently learning Morse code.

Amateur radio has opened the world to these students, many of whom have multiple disabilities. Students who had difficulty reading or writing now have packet pals, and send radiogrmas to friends and family around the world.

Many people with disabilities are severely limited in contact with the world outside of their home or school. Through the exciting medium of amateur radio, the CMRC is removing many of these limitations.

If you want to talk to club members, try them on 28.350 MHz from 4:15 to 5:15 p.m. on Wednesdays. You can leave them packet mail via NØCUH @ WB1DSW .NH. USA. NA. Club advisor Chris Edscorn NØCUH can be reached at (603) 547-3311 for more information.

A newsletter is also available by writing to Crotched Mountain Rehabilitation Center, Attn: Chris Edscorn, #1 Verney Dr., Greenfield, NH 03047. *TNX to Carol Ann Edscorn for the story.*

Members of the Crotched Mountain Amateur Radio Club. Back row (l to r): Advisor Chris Edscorn N0CUH, Tory Bryson, and Bob Kennedy. Front row (l to r): Lawrence Tsiokas, Astro Saulter, Gabe Mouradjian (callsign pending) and Michael Dorry.

New Model DJ-580T

RATED # 1 IN JAPAN, NOW AVAILABLE IN THE U.S.

A super-compact handheld, the tiny DJ-580T is a powerful, feature-packed twin bander. This super-compact HT is the smallest you'll find, and literally fits in the palm of your hand.

Ergonomic design, combined with excellent sensitivity and unbelievable great sound, sets a new standard for miniature HT's.

New MCF function allows you to set the 40 memory channels regardless of which channels you want for VHF or UHF. Any combination is possible.

Alinco's DJ-580T has Full-Duplex Cross Band Operation and Cross Band Repeater Functions with real world power and excellent sensitivity. Airband receive with simple modification.

If the battery is depleted to less than 5 volts, Alinco's Patented Super Low Battery Consumption Function is automatically activated. You can continue to operate the radio all the way down to 3.5 volts. This feature is effective with dry cell batteries only.

This unit has built in DSQ for paging, CTCSS encode and decode standard, various scanning functions, 3 power level selections for each band, bell function, and an illuminated keypad.

Check out the affordable technology of the 90's. Check out ALINCO.

ALINCO ELECTRONICS INC.

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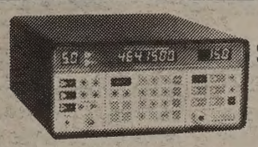
Two Year Limited Warranty.
Specifications and features are subject to change without notice or obligation.
CIRCLE 67 ON READER SERVICE CARD

RAMSEY ELECTRONICS

COM-3 $279.00

2 WAY RADIO SERVICE MONITOR

COM-3, the world's most popular low-cost service monitor. For shops big or small, the COM-3 delivers advanced capabilities for a fantatic price—and our new lease program allows you to own a COM-3 for less than $3.00 a day. Features •Direct entry keyboard with programmable memory •Audio & transmitter frequency counter •LED bar graph frequency/error deviation display •0.1–10.000 µV output levels •High receive sensitivity, less than 5 µV •100 kHz to 999.9995 MHz •Continuous frequency coverage •Transmit protection, up to 100 watts •CTS tone encoder, 1 kHz and external modulation.



RSG-10 $249.00

SYNTHESIZED SIGNAL GENERATOR

Finally, a low-cost lab quality signal generator—a true alternative to the $7,000 generators. The RSG-10 is a hard working, but easy to use generator ideal for the lab as well as for production test. Lease it for less than $3.00 a day. Features •100 kHz to 999 MHz •100 Hz resolution to 500 MHz, 200 Hz above •– 130 to + 10 dBm output range •0.1 dB output resolution •AM and FM modulation •20 programmable memories •Output selection in volts, dB, dBm with instant conversion between units •RF output reverse power protected •LED display of all parameters—no analog guesswork!

FREQUENCY COUNTERS

CT-70 7 DIGIT 525 MHz | **CT-90 9 DIGIT 600 MHz** | **CT-125 9 DIGIT 1.2 GHz**

Ramsey Electronics has been manufacturing electronic test gear for over 10 years and is recognized for its lab quality products at breakthrough prices. All of our counters carry a full one-year warranty on parts and labor. We take great pride in being the largest manufacturer of low-cost counters in the entire U.S.A. Compare specifications. Our counters are full-featured, from audio to UHF, with FET high impedance input, proper wave shaping circuitry, and durable high quality epoxy glass plated-thru PC board construction. All units are 100% manufactured in the U.S.A. All counters feature 1.0 ppm accuracy.

NEW CT-250 2.5 GHZ

ACCESSORIES FOR COUNTERS

Telescopic ship antenna—BNC plug, WA-10	$11.95
High impedance probe, light loading, HP-1	$16.95
Low-pass probe, audio use, LP-1	$16.95
Direct probe, general purpose use, DC-1	$16.95
Tilt bail, elevates counter for easy viewing, TB-70	$ 9.95
Rechargeable internal battery pack, BP-4	$ 8.95
CT-90 oven timebase, 0.1 ppm accuracy, OV-1	59.95

ALL COUNTERS ARE FULLY WIRED & TESTED

MODEL	FREQ. RANGE	SENSITIVITY	DIGITS	RESOLUTION	PRICE
CT-50	20 Hz–600 MHz	<25 mV to 500 MHz	8	1 Hz, 10 Hz	$189.95
CT-70	20 Hz–550 MHz	<50 mV to 150 MHz	7	1 Hz, 10 Hz, 100 Hz	$139.95
CT-90	10 Hz–600 MHz	<10 mV to 150 MHz <150 mV to 600 MHz	9	0.1 Hz, 10 Hz, 100 Hz	$169.95
CT-125	10 Hz–1.25 GHz	<25mV to 50 MHz <15 mV to 500 MHz <100 mV to 1 GHz	9	0.1 Hz, 1 Hz, 10 Hz	$189.95
CT-250	10 Hz–2.5 GHz typically 3.0 GHz	<25 mV to 50 MHz <10 mV to 1 GHz <50 mV to 2.5 GHz	9	0.1 Hz, 1 Hz, 10 Hz	$249.95
PS10B Prescaler	10 MHz–1.5 GHz, divide by 1000	<50 mV	Convert your existing counter to 1.5 GHz		$89.95

SPEED RADAR $89.95 complete kit SG-7

New low-cost microwave Doppler radar kit "clocks" cars, planes, boats, horses, bikes or any large moving object. Operates at 2.6 GHz with up to 1/4 mile range. LED digital readout displays speed in miles per hour, kilometers per hour or feet per second! Earphone output allows for listening to actual doppler shift. Uses two 1-lb coffee cans for antenna (not included) and runs on 12 VDC. Easy to build—all microwave circuitry is PC stripline. ABS plastic case with speedy graphics for a professional look. A very useful and full-of-fun kit.

BROADBAND PREAMP

Boost those weak signals to your scanner, TV, shortwave radio or frequency counter. Flat 25 dB gain, 1 to 1000 MHz. 3 dB NF. BNC connectors. Runs on 12 VDC or 110 VAC.
PR-2, wired, includes AC adapter $59.95

2M POWER AMP

Easy to build power amp has 8 times power gain, 1W in, 8W out, 2W in, 16W out, 5W is for 40W out. Same amp as featured in many ham magazine articles. Complete with all parts, less case and T-R relay.
PA-1, 40W pwr amp kit $34.95
TR-1, RF sensed T-R relay kit . $ 9.95

FM WIRELESS MIKE KITS

FM-3 SHOWN

Pick the unit that's right for you. All units transmit stable signal in 88–108 MHz FM band up to 300' except for hi power FM-4 that goes up to ½ mile.
FM-1, basic unit ..... $ 5.95
FM-2, as above but with added mike preamp ..... $ 7.95
FM-4, long range, high power with very sensitive audio section, picks up voices 10' away $14.95
FM-3, complete unit includes case, battery, switch, antenna, and built-in condensor mike. Excellent fidelity, very small, kit $16.95
FM-3WT, as above, but fully wired and tested $19.95
SMC, miniature sensitive mike cartridge for FM-1, 2, 4 ..... $ 2.95

MICROWAVE INTRUSION ALARM

A real microwave Doppler sensor that will detect a human as far as 10 feet away. Operates on 1.3 GHz, and is not affected by heat, light, or vibrations. Drives up to 100 mA output, normally open or closed, runs on 12 VDC.
Complete kit MD-3 . $19.95

MUSIC MACHINE

Neat kit that will produce 25 different classical and popular tunes, plus 3 doorchime sounds. Lots of fun for doorbells, shop, or store entrances, car horn, music boxes, etc. Runs on 9V battery or wall transformer. Excellent speaker volume and adjustable tempo and pitch. Add our case set for a handsome finished look.
Complete kit, MM-5 ..... $24.95
Case + knob set, CMM-5 . $12.95

PACKET RADIO

Two new versions are available for the Commodore 64 (P-64A) or the IBM-PC (P-IBM). Easy assembly "NO TUNING". Includes FREE disk software, PC Board and Full Documentation.

KIT	P-64A	$59.95
	P-IBM	$59.95
CASE	CPK	$12.95

LO NOISE PREAMPS

Make that reciever come ALIVE! Small size for easy installation with Hi-Q tuned input for peak performance. Excellent gain and noise figure—guaranteed to improve reception! Specify band: 2M—PR-10, 220 MHz—PR-20, 440 MHz—PR-40.
Each kit $17.95

TONE DECODER

A complete tone decoder on a single PC board. Features: 400–5000 Hz adjustable range via 20-turn pot, voltage regulation, 567 IC. Useful for touch-tone burst detection, FSK, etc. Can also be used as a stable tone encoder. Runs on 5 to 12 volts.
Complete kit, TD-1 . $5.95

VOICE ACTIVATED SWITCH

Voice activated switch kit provides switched output with current capability up to 100 mA. Can drive relays, lights, LED, or even a tape recorder motor. Runs on 9 VDC.
VS-1 kit. $6.95

TELEPHONE TRANSMITTER

Mini-sized with professional performance. Self-powered from phone line, transmits in FM broadcast band up to ¼ mile. Installs easily anywhere on phone line or inside phone!
PB-1 kit $14.95

NEW SPEAKER PHONE

Talk on the phone hands-free, great to put in shop or shack, press the button to answer—no actual phone needed. Works same as commercial units. Talk from anywhere in room, phone line powered—no battery needed. Super for family and conference calls or buy two for hands-free intercom! Add our case set for a pro look.
SP-1 ..... $29.95 Case-CSP $12.95

TICKLE STIK

A shocking kit! Blinking LED attracts victims to pick up innocent-looking can—you watch the fun! Ideal for office desks, parties, nosey know-it-alls!
TS-4 kit $9.95

LIGHT BEAM COMMUNICATORS

Transmits audio over infrared beam up to 30'—use simple lenses to go up to ¼ mile! Hum free, uses 30 kHz carrier. Great for wireless earphones or undetectable "bug."
Transmitter + receiver set, LB56 . . $19.95

FM RADIO

Full-fledged superhet, microvolt sensitivity, IC detector and 10.7 MHz IF. Tunes Std. FM broadcast band as well as large portions on each end. Ideal for "bug" receiver, hobby experiments or even as FM radio!
FR-1 kit $14.95

SUPER SLEUTH

A super sensitive amplifier which will pick up a pin drop at 15 feet! Great for monitoring baby's room or as general purpose amplifier. Full 2W rms output. Runs on 6 to 15 volts, uses 8–45 ohm speaker.
BN-9 kit $5.95

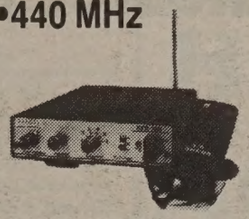
BROADBAND PREAMP

Very popular sensitive all-purpose preamp, ideal for scanner, TVs, VHF/UHF rigs, counters. Lo noise, 20 dB gain, 100 kHz–1 GHz, 9V–12 VDC operation.
SA-7 kit $14.95

•2 METERS •223 MHz •440 MHz

FANTASTIC FM TRANSCEIVERS

SYNTHESIZED—NO CRYSTALS



$149.95

Ramsey breaks the price barrier on FM rigs! The FX is ideal for shack, portable or mobile. The wide frequency coverage and programmable repeater splits makes the FX the perfect rig for Amateur, CAP or MARS applications. Packeteers really appreciate the dedicated packet port, "TRUE-FM" signal and almost instant T/R switching. High speed packet? . . . . No problem. Twelve diode programmed channels, 5W RF output, sensitive dual conversion receiver and proven EASY assembly. Why pay more for a used foreign rig when you can have one AMERICAN MADE (by you) for less. Comes complete less case and speaker mike. Order our matching case and knob set for that pro look.

FX-146 kit (2 Meters)	$149.95
FX-223 kit (1¼ Meters)	$149.95
FX-440 kit (3/4 Meters)	$169.95
CFX matching case set	$ 24.95

2 MTR & 220 BOOSTER AMP

Here's a great booster for any 2 meter or 220 MHz hand-held unit. These power boosters deliver over 30 watts of output, allowing you to hit the repeater's full quieting while the low noise preamp remarkably improves reception. Ramsey Electronics has sold thousands of 2 meter amp kits, but now we offer completely wired and tested 2 meter, as well as 220 MHz, units. Both have all the features of the high-priced boosters at a fraction of the cost.
PA-10 2 MTR POWER BOOSTER (10 X power gain)
Fully wired & tested $89.95
PA-20 220 MHz POWER BOOSTER (8 X power gain)
Fully wired & tested $89.95

QRP TRANSMITTERS HAM RECEIVERS

20, 30, 40, 80M CW TRANSMITTERS

Join the fun on QRP! Thousands of these mini-rigs have been sold and tons of DX contacts have been made. Imagine working Eastern Europe with a $30 transmitter—that's ham radio at its best! These CW rigs are ideal mates to the receivers at right. They have two-position variable crystal control (one popular QRP XTAL included), one watt output and built-in antenna switch. Runs on 12VDC. Add our matching case and knob set for a handsome finished look.
Your choice of bands $29.95
(Specify band: QRP-20, 30, 40 or 80)
Matching case & knob set, CQRP $12.95

20, 30, 40, 80M All Mode RECEIVERS

Build your own mini ham station. Sensitive all-mode AM, CW, SSB receivers use direct conversion design with NE602 IC as featured in *QST* and ARRL handbooks. Very sensitive varactor tuned over entire band. Plenty of speaker volume. Runs on 9V battery. Very EASY to build, lots of fun and educational—ideal for beginner or old pro. New 30-page manual. Add the case set for well-fitted professional look.
Your choice of bands $29.95
(Specify band: HR-20, HR-30, HR-40, HR-80)
Matching case & knob set, CHR $12.95

E-Z KEY CMOS KEYER

Send perfect CW within an hour of receiving this kit! Easy-to-build kit has sidetone oscillator, speed control and keys most any transmitter. Runs for months on a 9V battery. 28-page manual gives ideas on making your own key for extra savings. Add our matching case set for complete station look.
CW-7 kit $24.95
Matching case knob set, CCW $12.95

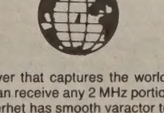
ACTIVE ANTENNA

Cramped for space? Get longwire performance with this desktop antenna. Properly designed unit has dual HF and VHF circuitry and built-in whip antenna, as well as external jack. RF gain control and 9V operation makes unit ideal for SWLs, traveling hams or scanner buffs who need hotter reception. The matching case and knob set gives the unit a hundred dollar look!
AA-7 Kit $24.95
Matching case & knob set, CAA $12.95

SPEECH SCRAMBLER

Communicate in total privacy over phone or radio. Kit features full duplex operation using frequency inversion. Both mike and speaker or line in/out connections. Easy hookup to any radio, and telephone use requires no direct connection! Easy to build 2 IC circuit. Can also be used to descramble many 2-way radio signals. Finish your kit off with the handsome case & knob set.
SS-7 kit $29.95
Matching case & knob set, CSS $12.95

SHORTWAVE RECEIVER



Fantastic receiver that captures the world with just a 12" antenna! Can receive any 2 MHz portion from 4–11 MHz. True superhet has smooth varactor tuning, AGC, RF gain control, plenty of speaker volume and runs on a 9V battery. Fascinating Scout, school or club project provides hours of fun for even the most serious DXer. For the car, consider our shortwave converter. Two switchable bands (in 3–22 MHz range), each 1 MHz wide—tunable on your car radio dial. Add some interest to your drive home!
Shortwave receiver kit, SRI $27.95
Shortwave converter kit, SCI $27.95
Matching case set for SRI, CSR $12.95
Matching case set for SCI,CSC $12.95

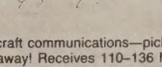
2, 6, 10 MTR, 220 FM RECEIVERS

Keep an ear on the local repeater gang, monitor the cops, check out the weather or just plain listen around. These sensitive superhet receivers are just the ticket. They tune any 5 MHz portion of the band and have smooth varactor tuning, dual conversion with ceramic IF filters, AFC, adjustable squelch and plenty of speaker volume. Runs on 9V battery and performance that rivals the big rigs! For a complete finished pro look, add our matching case and knob set with screened graphics.
FM communications receiver kit $29.95
Specify band: FR 146 (2m), FR6 (6m), FR10 (10m), FR-220 (220 MHz)
Matching case & knob set, CFR $12.95

FM STEREO TRANSMITTER

Run your own stereo FM station! Transmit a stable signal in the standard FM broadcast band throughout the house, dorm or neighborhood. Connects easily to line outputs on CD player, tape decks, etc. Runs on 9V battery, has internal whip antenna and external antenna jack. Add our case set for a "station" look!
FM-10 kit $29.95
Matching case set, CFM $12.95

AIRCRAFT RCVR



Hear exciting aircraft communications—pick up planes up to 100 miles away! Receives 110–136 MHz AM air band, smooth varactor tuning superhet with AGC, ceramic filter, adjustable squelch, excellent sensitivity and lots of speaker volume. Runs on 9V battery. Great for air shows or just hanging around the airport! New 30-page manual details pilot talk, too. Add case set for "pro" look.
AR-1 kit $24.95
Matching case set, CAR $12.95

TERMS: Satisfaction guaranteed. Examine for 10 days. If not pleased return in original form for refund. •Add $3.75 for shipping, handling and insurance. •For foreign orders add 20% for surface mail. •COD (U.S. only) add $5.00. • Orders under $20, add $3.00. •NY residents add 7% sales tax. •90-day parts warranty on kit parts. •1-year parts & labor warranty on wired units.

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FAX 716-924-4555

RAMSEY ELECTRONICS, INC. 793 Canning Parkway, Victor, NY 14564

CIRCLE 34 ON READER SERVICE CARD

HT Mobile Enhancement

A neat, simple solution.

by Phil Salas AD5X

Due to its small size and numerous features, I really like my ICOM IC-24AT dual-band handie-talkie. For mobile operation, you can purchase a speaker/mike for about $32 and a filtered cigarette lighter power cable for $18. However, for less than $15, you can have all the features of the speaker/mike and power cable. *[Ed. Note: This project, as written, will work with the ICOM IC-24AT and IC-2SAT HT. As long as you use the correct mike, speaker and power plugs, this project should work fine on any HT. Check your operator's manual for correct mike wiring.]*

Here's the Idea

The IC-24AT is actually not much larger than a speaker/mike. It didn't make much sense to me to add a speaker/mike at the end of a coil cord attached to the IC-24AT. Instead, why not bring filtered DC power and the antenna lead-in through a retractable coil cord and use the IC-24AT as a speaker/mike? This also gives you a touch-tone pad in your hand for easy autopatch operation.

The Coil Cord

Radio Shack sells a "Coiled Communications Cable" replacement microphone cable for $2.99 (RS 278-356). This cord is a five-foot extended, two-foot retracted, four-conductor coiled cable with one of the conductors shielded. This cable was just what I was looking for.

To use this cord, you will first need to prepare both ends as shown in Figure 1. First, strip both ends back three inches. Slide a 3" length of heat shrink tubing over the main cable, and a 2-1/2" length of smaller diameter heat-shrink tubing over the shielded conductor and the white wire. The heat shrink tubing is also available from Radio Shack. For the BNC connectors, I used crimp-on style connectors with the shield soldered to the BNC collar. I also soldered the BNC center pin to the center conductor of the shielded wire.

When you've finished soldering the BNC connectors onto the shielded cable on both ends, slide the smaller diameter heat-shrink tubing up and over the soldered shield. Again, the white wire should also be under the heat-shrink tubing. The white wire will give stress relief to the shielded cable. Cut off any excess white wire. Shrink the tubing in place. Now slide the larger diameter tubing over so that it covers the half-inch of exposed braid, and shrink this tubing in place.

RF Tests

At this point I made some RF measurements to see how well this microphone cable was going to work at 144 and 450 MHz. I have a "perfect" dummy load good through 450 MHz. I verified that I could measure a 1:1 VSWR directly into this load. Next I put the cable between the IC-24AT and the dummy load. I measured a 1:1 VSWR at 146 MHz, and a 1.1:1 VSWR at 445 MHz. This was much better than I expected.

My next test was to measure the loss of the cable. Unfortunately, I found that the cable had 3 dB of loss at both 445 and 146 MHz. However, this isn't as bad as it sounds.

Most handie-talkie factory-supplied whips have around a 3 dB loss. Since I was using a "top-of-car" gain antenna, I was actually about 2 dB better than normal. Also, running the IC-24AT from 12 volts, I could put out 5 watts, which is 5 dB better than running on the standard battery pack (1.5 watts).

Filtered DC Powering

The DC filtering circuit I used is shown in Figure 3. This is a simple L/C circuit supplemented with a 15 volt zener diode to protect against any transients. Again, all parts are available from Radio Shack. The inductor is a 100 µH, 2 amp choke (RS 273-102), the capacitor a radial 22 µF electrolytic (RS 272-1026), and the zener diode 15 volts (RS 276-564). I built this filter circuit into a heavy duty cigarette lighter plug (RS 274-335), as shown in Figure 2.

Before building the filter, the heavy duty plug must be modified somewhat. The center plastic rib must be cut out, as this is where the inductor will be placed. A pair of cutters, and the job will take only seconds. To build the filter, first put heat-shrink tubing over the inductor and shrink in place.

Then solder one end of the inductor to the positive terminal as shown in Figure 2. Attach a red wire from one end of the coil cord to the free inductor wire and solder. Now put some insulated sleeving over the rest of the free inductor wire, and bend it back into the plug where it can be soldered to VR1 and C1.

Now, solder the black coil cord wire to the ground terminal of the plug as shown in Figure 2. Reassemble the plug and fill the openings around the inductor with hot glue. Also cover any exposed bare wire with hot glue.

You're just about finished. Just attach the red and black wires at the other end of the coil cord to the DC power connector (RS 274-1571) which will plug into the IC-24AT. You're finished!

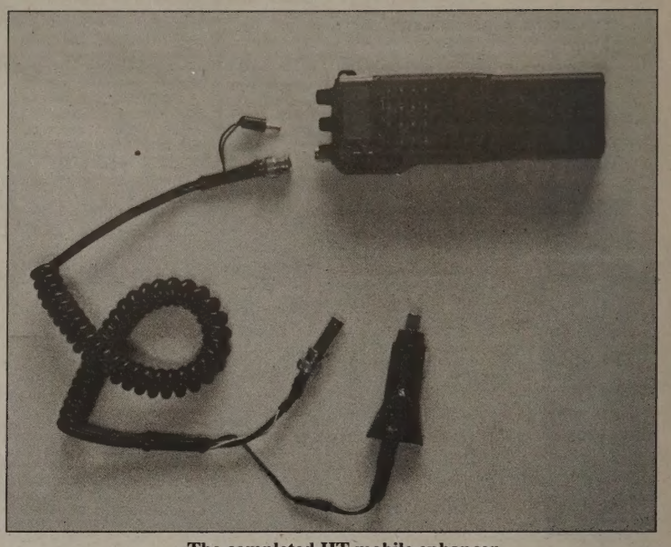
Installation

I use a 25-cent cupholder I got from Western Auto as a holder for my IC-24AT. The BNC and DC power connector plugs into the top of the handie-talkie. The other end of the coil cord meets the cigarette lighter socket and a mating BNC connector which goes to the roof-top antenna. The installation is neat and simple and doesn't involve a jumble of wires.

A simple mobile setup designed for the IC-24AT has been described. The IC-24AT is used as the mobile speaker/mike with all power and RF being brought into it through an easily obtainable microphone coil cord. This installation greatly enhances your mobile station and operating convenience at a very low cost.

RF

You may write Phil Salas AD5X at 1517 Creekside Drive, Richardson TX 75081.



The completed HT mobile enhancer.

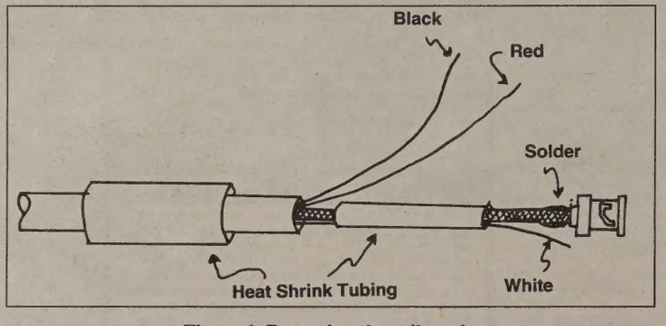


Figure 1. Preparing the coil cord.

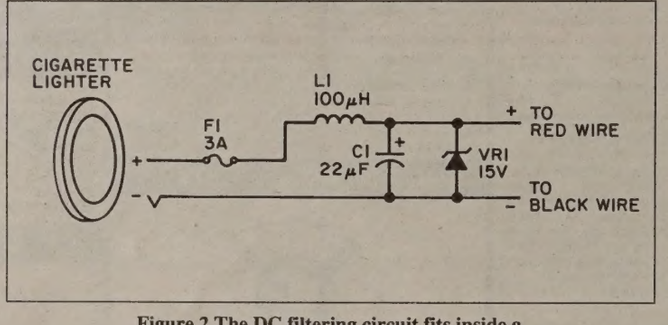


Figure 2 The DC filtering circuit fits inside a heavy duty cigarette lighter plug (RS 274-335).

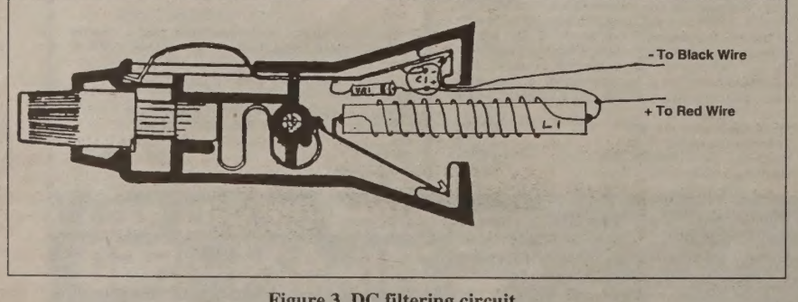


Figure 3. DC filtering circuit.

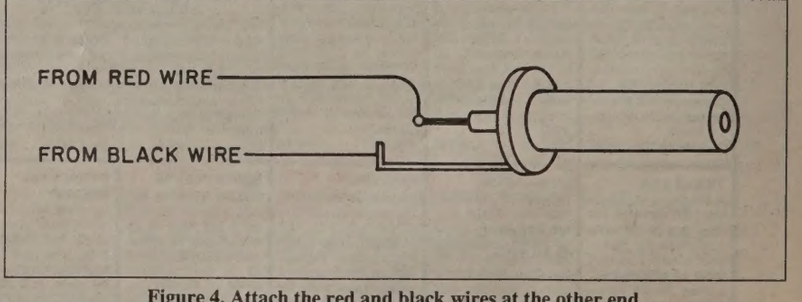


Figure 4. Attach the red and black wires at the other end of the coil cord to the DC power connector.

Radio Fun

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letters

Write to: Radio Fun, 70 Route 202-N, Peterborough NH 03458

Eugene Triebold KEØFB, Leeds ND I would like to offer a suggestion for articles to publish. I read your February 1992 issue and thought it was an excellent idea to rerun the article on the Drake TR-4CW transceiver. I have been thinking about this for a long time. So often an article refers back to an article that was written 15 to 30 years ago. There have been many excellent articles written over the years, but you need a library to have all these issues available.

Also, there is still a lot of equipment in use that is 15 to 40 years old. It is available for sale at hamfests, in the classifieds, etc., but information is hard to find unless you have a back issue library. And, today we are getting more "appliance operators" and fewer builders, so good articles are harder to get and equipment is more complex.

Dean H. Miller II KA2RWQ, Palmdale CA I have recently returned to the air after several years of limbo. As I excitedly tuned my radio to 10 meters I discovered something rather horrible. There was a station that was using profane language as he made comments about official observers who were listening to him. I couldn't believe my ears as I listened to his obscene statements about other ham radio operators. Numerous times he questioned the sexual preferences and the family history of the ham radio population.

I became deeply concerned but refrained from writing to anyone on the subject, hoping that what I had heard was an isolated incident. Unfortunately, it was not. For the next two days I tuned in on the frequency and heard the same garbage as before. The problem seems to be getting worse.

This individual is using the airwaves that the ham radio community fights very hard to keep, in such a way that gives ham radio opposition a reason to take away frequency privileges from us. He is ruining it for all of us. Not just the Novices, but all who enjoy the amateur radio hobby.

Years ago I turned my back on CB because of the very same problem. This type of behavior on the air makes our beloved hobby just another forum for little-minded, four-letter-word-worshiping morons to misuse this great asset in our world. I feel that there is enough profane language elsewhere in the world to be heard, so we don't need to hear it on our only escape vehicle from the profane world.

If there is anyone else out there who has heard this rubbish on the air and is as upset about it as I am, please write to anyone that you possibly can. This includes this and other ham radio magazines, the ARRL and the FCC. I am only one voice, but with a lot more voices joining me perhaps we can rid our airwaves of such "radio operators" and return professionalism to the radio spectrum.

(Ed. Note: The exact frequency and callsign of the station Mr. Miller refers to has been omitted. The last thing we want to do is help attract attention to bad operators.)

Greg Dean N9NWD When I returned from Saudi Arabia in November 1991, I wanted to see new growth. I had taken the Technician class exam in Dhāran, Saudi Arabia, care of the radio club, HZ1AB. Ever since the no-code concept had been proposed, I had thought it would be ideal in an academic setting.

As a member of the Purdue Amateur Radio Club, W9YB, a class was organized and advertisements put up. Fourteen individuals were tested by the local VE team.

Passing the no-code Technician exam: Xhixin Chang, Ph.D student in electrical engineering from the People's Republic of China; Ken Lou, Ph.D student in math; Ghobad Heidari, Ph.D student in electrical engineering; Nancy Mantick, staff member at Purdue (B.S. in horticulture and graduate studies in biology); Kimberly Kozak, a senior in Civil Engineering; Cynthia Cottom, a senior in electrical engineering; Christopher Bohn, a senior in electrical engineering; Richard Long, a senior in computers and electrical engineering; Brent Irvine, a senior in electrical engineering; Kevin Nunn, a senior in electrical engineering technology; David Halsema, a junior in computer science; Jonathon Bradshaw, a freshman in computer technology; and Travis Bailey, a freshman in electrical engineering technology. Uprading: Ron Moll KA9RVV, professional staff, upgraded to Technician; and Perry Ramsey N9LFF, Ph.D student in atmospheric science and secretary of the Purdue Amateur Radio Club, upgraded to Advanced Class.

Bennett Torre WA2DNA, Belleville NJ I am 30 years old. While many would consider me to be a young kid, I have lived through many technological changes. As a child of technology, I find myself influenced during every moment of my waking hours. I have also learned that you can't know where you're going unless you know where you've been—ESPECIALLY when it comes to technology. I am an unemployed computer consultant. I hold a General class license, but haven't been on the air in over 10 years. Why? Well, apart from hamfests, amateur radio doesn't have the excitement it did for me when I was in 8th grade.

Where did all the fun go? I miss the days when the technology was big enough to see. I miss the vacuum tubes with the warm glow. A lot of the experimentation has disappeared and there are damned few people out there who build their own gear anymore. The technology is getting out of reach, and plenty out there are actually DISCOURAGING people from learning about it. Being a hot rodder, I see the same trend in the automotive industry—try and debug the computer on a '92 Mustang sometime. It has actually gotten to the point where once common items like McIntosh tube amps, Dynaco gear, old Mustangs and Camaros, old guitar amps, old tubes, etc. are now prized collector's items! These were

Continued on page 30.

the tech side

by Michael Jay Geier KB1UM

More Kit Building

Last time, we were exploring the topic of kit building. Let's finish that up and move on to something new: connectors.

OK, so you've got your kit's PC board built up. If there are no dangerous voltages involved, now might be a good time to test the board. But if it runs on AC or generates high voltages, you would be wise to avoid applying power to it at this point, for safety's sake. Remember, nothing is worth hurting or killing yourself over.

Now what? Well, if the kit came with a pre-made cabinet, which many do, just follow the instructions for mounting the board and controls, and you're all set. If, however, the kit consists only of the PC board, it's up to you to find something to put it in.

Decisions, Decisions

There are lots of ways to house an electronic circuit. First of all, do you want it to look like a slick commercial product? If so, you're pretty much limited to buying a nice cabinet, drilling it and installing your circuit. Even then, you're faced with the task of making a pretty panel, and that is much easier said than done.

But why does it have to look like you bought it? For me, part of the fun of homebuilt gear is that it looks unique and funky. If you're of like mind, you now have a whole range of cheap, interesting cabinet choices.

Like What?

Like cassette boxes, 35mm film canisters, pill bottles, Tic-Tac boxes, floppy disk cases, you name it! If it's anything like mine, your house is brimming with free cabinets for your projects. Why spend $15 for a fancy box when you can put your gadget into something cute from your kitchen?

Naturally, your device must fit into the dimensions of the chosen box. Luckily, most electronic projects are pretty small these days. It certainly was more of a problem in the tube days, when you had to drill a chassis and mount a socket for a hot, glass part!

Electrical Considerations

Of course, there still are some things to watch out for. Some solid-state circuits can get quite hot, and you don't want those bottled up with no air flow or pressed against meltable plastic. In particular, voltage regulators and power transistors often dissipate enough power to require cooling. Even if your project doesn't call for a heat sink, check the temperature of the power-handling parts with your finger (with the power off and the power source completely disconnected, please—an on/off switch isn't enough!) after the device has run for awhile. If you can't touch it for more than a second or two, it's too hot and should be heat-sinked. If your project requires a heat sink on any part, consider mounting that heat sink where air can reach it. Also, be careful not to press the heat sink up against any plastic because it may melt your cabinet! Even an eighth of an inch of clearance is a great deal better than none at all.

Shielded From Harm

If your gadget involves low signal levels, it may need some shielding to avoid picking up unwanted electrical noises. Such noises can come from appliance motors, street lamps and, of course, the output of your amateur transmitter! The easiest way to shield a circuit is to mount it in a metal box and connect the box to the circuit's ground point. With such an arrangement, it is very unlikely that any extraneous junk will get in. Of course, it is still possible for one part of a circuit to generate enough noise to interfere with another part of the circuit on the same board, but it doesn't happen very often. Besides, the kit manufacturer should have dealt with that in the design.

If you do go the metal box route, be extremely careful if your circuit runs on AC power or it has any high voltages in it. The last thing you want is for that AC to short to the box. One touch and it could be your last project! The only way I can feel comfortable about an AC-operated circuit in a metal box is if the box is grounded to the ground prong in a three-wire AC plug. That holds true even for commercially-built gear. I'm not wild about polarized plugs; not only are they a pain in the butt, they also depend upon the wall socket's being properly wired, and I have seen many that were done wrong. If it's backward and you come in contact with the hot side . . . well, you can guess the rest.

By the way, when I talk about AC-operated devices, I mean those in which the AC power actually enters the box. Projects which use those little wall cube transformers generally only have low voltage entering the enclosure, and I consider them pretty safe. I suppose it's possible for a short to make a wall cube dangerous, but I've never seen it happen. But it never hurts to be careful.

Outward Bound

Shielding can be important for another reason. Some circuits, and especially digital devices using TTL chips, can generate lots of interference on their own! Not only might your new toy mess up your reception on 10 meters, it could also put trash on your neighbors' TV screens, and you don't want that, believe me. In fact, a good way to tell if your circuit requires shielding is to put it next to your TV while you try to watch a program on a channel below Channel 7, using the "rabbit ear" antenna built into the set. If the TV and the kit don't bother each other, everything is fine the way it is. If there is some interference, start moving the circuit away from the TV until it quiets down. If it only takes a few inches, it's probably no big deal. If you can still see the problem across the room, start looking for a shielded box!

Of course, there are ways to shield a circuit other than a metal box. You can use shielding foil over the offending circuits. Unfortunately, household aluminum foil just doesn't work for this purpose; it's too thin, it's the wrong kind of metal (aluminum makes a lousy shield), and you can't solder to it for the ground connection. Copper shielding foil is available and it works great, but you have to mail-order it and it ain't cheap. Much Japanese gear uses something called "mu-metal" shielding material, and it works extremely well. Usually, it is thick enough to be very stiff, but I've also seen it in foil form. I know of no place to buy this stuff in the U.S., but you can salvage some from dead VCRs, TVs, receivers, etc.

There are three rules of thumb regarding shielding:

1. The thicker the better.
2. Ground the shield to circuit ground.
3. Insulate the shield and don't let it touch any part of the circuit!

Plugs and Jacks

If your kit requires connectors but doesn't provide them, you may have some decisions to make regarding which ones to use. It might seem obvious that you can use whatever you happen to have, but it really isn't a good idea. Some connectors are better suited to some jobs than others. For instance, you wouldn't want to use an earphone jack to couple an antenna to a transmitter, because the circuit could be damaged if you happened to pull the plug out of the jack while you were transmitting. Besides, the contact area is very small and it couldn't handle much power before overheating.

Let's take a look at various kinds of plugs and jacks and see which are best for which applications.

RCA jacks: These are the "phono" jacks like the ones on your stereo. They are also used for the video and audio inputs and outputs on VCRs. They have fairly large contact area and they tend to stay put. Also, they are coaxial (the plug's center protrudes from an outer shield) so the signal remains shielded when the plugs are plugged in. All in all, they're nice connectors, and cheap too. Many homebuilt low-power (QRP) radios use them for the antenna jack. At the 10-watt level, they're fine. I wouldn't try to run 100 watts through one, though. Also, be aware that because the tip of the plug sticks out quite a bit, the RCA plug is not suitable for supplying power from a power supply or batteries. That long tip is just looking to short against something when it is not plugged in. For signals, though, this connector is hard to beat. An added plus: It's an easy jack to mount on your panel.

Earphone jacks: They are very handy for audio input and output. Don't use them to supply power, because they tend to short momentarily as you plug and unplug them. Besides, they are easy to short when unplugged. Also, I find that they get dirty and make poor contact after awhile. They are easy to accidentally pull out, so you don't want to use them for transmitting antennas. Besides, their small contact area and unpredictable contact quality make them lousy where microvolt signals are involved, so they're poor even for receivers. I have a shortwave receiver which uses an earphone jack for the antenna, and touching or wiggling the plug always causes crackles in the signal. A plus: Like RCA jacks, earphone jacks are easy to mount because they require only a single hole.

Coaxial jacks: These are the ones used in much consumer electronics gear for connecting wall cube transformers to the sets. They're great for low-voltage DC power because the center of the plug is recessed, eliminating the shorting problem. They come in various sizes, which can make it a pain to locate matching pairs. It is wise to connect the circuit ground (almost always the minus terminal) to the outside of the jack, because it protects the positive terminal from shorts when using the device in the car. Remember, cars are negative-grounded, so any positive car power touching a metal car part is trouble. Even Sony, which for years put the negative at the tip and the positive on the sleeve, has figured this out and switched it around on their new models.

A minus: The jacks are a pain to mount, because they usually require four small screws and drilling the holes very close to the main hole is quite tough. The best way is to mount the jack on the PC board by its leads and align it with the hole in the box.

DIN jacks: These are the round ones with anywhere from four to eight pins. They're very common in Europe but pretty rare here. For audio, they are excellent because you can combine various inputs and outputs in one plug. The pins are pretty close together, though, so you don't want to connect strong high-frequency signals unless you can tolerate their leaking into the other lines a little. Although they sometimes are used to supply DC power, especially in systems which require multiple power supply voltages, DIN plugs aren't ideal for that because the pins can be shorted against metal objects. The outer shroud keeps them reasonably well protected, though, so they are serviceable as long as they aren't used in the car.

In my experience, DIN jacks make very good connections, and they tend to stay put. Some even have locking capabilities. Unfortunately, they are not easy to mount, for the same reasons the coaxial jacks are difficult. With the DIN jacks, though, the whole assembly is bigger, so it's not quite as bad.

PL-259: These are the so-called "UHF" connectors which are found on CB, amateur and other HF (high frequency: under 50 MHz) radios. They work well as antenna jacks. The plugs are a real pain to connect to coaxial cable, and once you put one on you will never get it off. Despite the UHF designation, they aren't very good at UHF and higher frequencies. At one time, even 100 MHz was considered UHF! These connectors were not designed with gigahertz in mind.

PL-259s have large contact area and can handle any amount of RF power we hams are legally entitled to use, as long as the frequency is in range. HF kilowatt linear amps use PL-259s. However, there seems to be quite a bit of quality variation in these connectors. The cheap ones use insulating material that can heat up and melt under high power. They're fine for a 5-watt CB, but you shouldn't try to run your ham linear through them.

The jacks require multiple holes, but they are big enough that this is not too much of a problem.

BNC plugs: These are the kind used on laboratory oscilloscopes, HT antenna jacks and other gear involving very fast signals. They have small contact area, so they aren't to be used for high power. They lock on, making it unlikely you'll accidentally wreck a circuit by bumping into the wire. The BNC connector was carefully designed to have electrical characteristics similar to coaxial cable, so there is very little loss through it up through the UHF range. Some BNC jacks mount with a single hole, while others require closely-spaced multiple holes, making them difficult to mount. Also, the plugs can be hard to mount on various size cables. Finally, BNCs are not as easy to find as many other plugs. For audio, they're overkill. But for low-power RF, they're hard to beat.

Molex-type power plugs: These are the square connectors made of plastic. They are used exclusively for supplying large amounts of low-voltage power. Many 12-volt HF rigs use them for their DC lines because they can pass the 20 amps of peak current without getting hot. They are not coaxial or shielded, so they aren't good for small signals. Besides, they're awfully big. Their square shape makes it hard to cut holes for them, but they snap right in with no screws.

B-type computer connectors: These underutilized connectors come in 9- (DB9), 15- (DB15) and 25-pin (DB25) sizes, with the DB25s being the most common. Normally used for serial ports on computers, they are absolutely great for all kinds of small-signal and control line work. They give you the ability to connect lots of

activities calendar

(Continued from page 26.)

May 16-17
GLASGOW, KY The Mammoth Cave ARC and the Kentucky Colonels ARC will operate a special event station to commemorate the Kentucky Bicentennial. It will operate from the Barren River State Park using call sign KD4SS, and can be found in the General portions of 10 thru 80 meters. Operation will begin at 1700Z on May 16-1700Z on May 17. QSL KD4SS, 309 East Main St., Glasgow KY 42141.SASE please.

RALEIGH, NC The Raleigh ARS will operate Station, W4DW, to celebrate the bicentennial of the capital city from 1500 UTC-2200 UTC on both days. Operation will be in the General portion of the voice bands on 20, 40, and 75 meters, and the Novice portion of 10 meters. For commemorative QSL card, send a #10 SASE to RARS 200, PO Box 17124, Raleigh NC 27619.

ST. CHARLES, MO The St. Charles ARC will operate WB0HSI from 1300Z to 2100Z as part of the Lewis and Clark Rendezvous. We will transmit on 7265, 14265, 21365, 28465, 146.67, and AO-13 145.935 (mode B) and 435.970 (mode J) as propagation and QRM permit. For 8.5 x 11 certificate, send a large SASE to the St. Charles ARC, PO Box 1429, St. Charles MO 63302-1429.

WINFIELD, IL The DuPage ARC will operate Club Station W9DUP, to commemorate Armed Forces Day. Operation will be from the Cantigny War Museum. This event is from 1600 UTC-2300 UTC. Suggested frequencies are 7.250, 14.290, 28.400 SSB and 145.25 (-0.600). For a certificate, send QSL and SASE to Jack Carr NV9S, DARC PO Box 71, Clarendon Hills IL, 60514.

May 16-18
HOUSTON, TX The Brazos Valley ARC will operate WD5DRB from 0000Z May 16-0000Z May 18 to celebrate B-VARC's 15th Anniversary. Operation will be in lower 25 kHz of the General 80, 40, 20, and 15 meter subbands, and 28.488 MHz of the Novice subband, with special endorsement for past or present B-VARC members with callsigns. For a certificate, send QSL and SASE to B-VARC, PO Box 1630, Missouri City, TX 77459-1630.

SOUTHFIELD, MI The 1992 QSO Party will be sponsored by the Oak Park ARC. Phone and CW are combined into one contest. Frequencies CW: 1810, 3540, 3725, 7035, 7125, 14035, 21035, 21125, 28035, 28125. Phone: 1855, 3805, 7280, 14280, 21380, 28580. VHF: 50.125, 145.025, 146.52. Scoring: MI Stations: 1 point per QSO X (States + Countries + Michigan counties) on phone. VE counts as a country. Five points for each W8MB contact. Non-Michigan Stations: QSO points x Michigan Counties. One point for each Michigan phone QSO and two points for each CW contact. Five points for each club station contact with W8MB/W8MB/mobile. No rptr. contacts are allowed. Awards. Certificates. Send logs to Mark Shaw K8ED, 27600 Franklin Rd., Apt. 816, Southfield MI 48034.

May 17
CRESSKILL, NJ The Bergen ARA in conjunction with Camp Merritt American Legion Post 21, will operate K2UFM from 1300Z to 2100Z to celebrate the 75th anniversary of Camp Merritt and the Rededication of the Camp Merritt Memorial Monument. Operation in General phone portion of 40-80-20-15 meter bands and the Novice portion of the 10 meter band. For certificate, send QSL and SASE 9 x 12 envelope to Warren P. Hagar K2UFM, 31 Forest Dr., Hillsdale NJ 07642-1351.

May 22-June 14
WIESBADEN, GERMANY The Wiesbaden Germany ARC will operate station HB0DA1WA during its 17th annual DXpedition to Liechtenstein. Operation will be 24 hr/day on all bands 160m through 10m, SSB and CW. QSL card will be printed and should be through DJ0LC for stations outside the U.S. and Canada or through KN6G for stations within the U.S. and Canada. Please send SASE. Contact Ronald H. Kellerman DA1RO/KD4DNA, 435 TAW/WXF, PSC 5, Box 38 APO AE 09057.

May 23-24
SUMTER, SC The Sumter ARA will hold its Iris Festival May 23 & 24 2000 UTC-2000UTC. Station call: WA4UMU. Lower 10 kHz of General bands: 10m, 15m, 20m, & 40m. Lower 10 kHz of Novice/Tech. Band: 10m. Communication Mode: VOICE only (all Bands). QSL Certificates available with SASE. Contact Sumter ARA, PO Box 193, Sumter, SC 29150-8862.

WATSON, IL The National Trail ARC will operate at the annual Memorial Day Homecoming. Effingham County. 28.4+ and lower General phone bands. For QSL, SASE. To Callbook: K9UXZ.

May 28-31
GREENWOOD, NOVA SCOTIA The Greenwood ARC will operate Station VE1RCAF Jan. 1-Dec. 31, 1992 to celebrate the 50th Anniversary of Canadian Forces Base. For commemorative QSL (and possible certificate) send QSL and SASE (CDN) or SA envelope and IRCs to Greenwood ARC, PO Box 63, Greenwood Nova Scotia, Canada, BOP INO. QSLs sent via Bureau will receive QSL card only via Bureau. RF

tech side

(continued from page 6.)

wires at once. Also, you can separate the signals fairly far from each other when you want to. I wouldn't use them for RF, high voltage or high current, but they excel when you want to send a few audio lines, switch contacts, volume control or other signal lines back to the board.

With any connector, it pays to use the female part for the side which generates the power and the male one for the side receiving it. That way, the power is more protected when the connectors are unplugged.

Well, that about does it for common connectors. See you all next month. RF

Amtrak Portable

by Larry J. Clark N2MOS

"CQ CQ CQ. This is N 2 M O S, NOVEMBER TWO MIKE OSCAR SIERRA, Westbound on Amtrak's California Zephyr." Hold it! I've already beamed us somewhere out west of Chicago, and I didn't even tell you how this all got started.

I happen to like trains (even though I commute by rail from central New Jersey to Manhattan every day). I'm also new to amateur radio, being one of the thousands who, after years of SWLing and scanning, jumped into the ham side with no-code in 1991. So how do you combine them both? Easy, but you should do a little planning.

I've wanted to take a coast-to-coast train trip for years, but the idea of "getting there and back," using up about eight days of a two-week vacation, didn't have much appeal. When Amtrak announced their Air/Rail package last year (see the sidebar), I was ready.

The Trip

My rail trip was from Washington, D.C., to Philadelphia (coach); the Broadway Limited from Philadelphia to Chicago (Slumbercoach room); the California Zephyr from Chicago to Sacramento (economy bedroom); and finally the Coast Starlight from Sacramento to Redding, California (coach). Having made a few shorter trips, I knew that low amperage AC power is available in the private rooms, so I could count on power for my HT most of the trip.

Preplanning

If you're going to hit the repeaters across country, you've got to do some research. The *ARRL Repeater Directory* is a must. However, by itself, you are missing key geographic information. Get a copy of Rand McNally's *Handy Railroad Atlas of the United States* (try hobby stores that sell model railroad supplies). Working through the stops in the Amtrak timetable, you can highlight your route across country, and begin to identify the repeaters along the route. For your preplanning, you may still need to consult a regular atlas, since the *Railroad Atlas* doesn't show non-railroad towns, counties, rivers, etc. Don't be afraid to "pencil up" the *Railroad Atlas*. Those notes will save you time and trouble later. Depending on what you are using for an antenna, it is also important that you try and determine on which "side of the tracks" the repeaters are (more on this later).

The reference kit you take on the train should include the timetable, the *Railroad Atlas*, the *ARRL Repeater Directory*, and a logbook. You might also bring along Art-Sci's *U.S. Repeater Mapbook*.

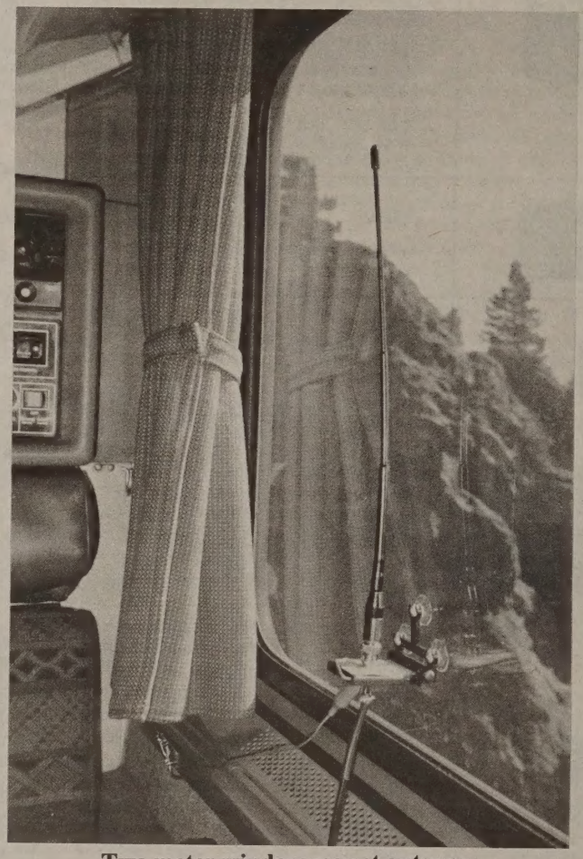
A list of railroad frequencies is handy. If your HT has extended receive capabilities, you can listen in on train operations. Road frequencies for Amtrak trains are those of the host railroad (listed in Amtrak's timetable) except for the Northeast Corridor, which Amtrak owns.

On Board

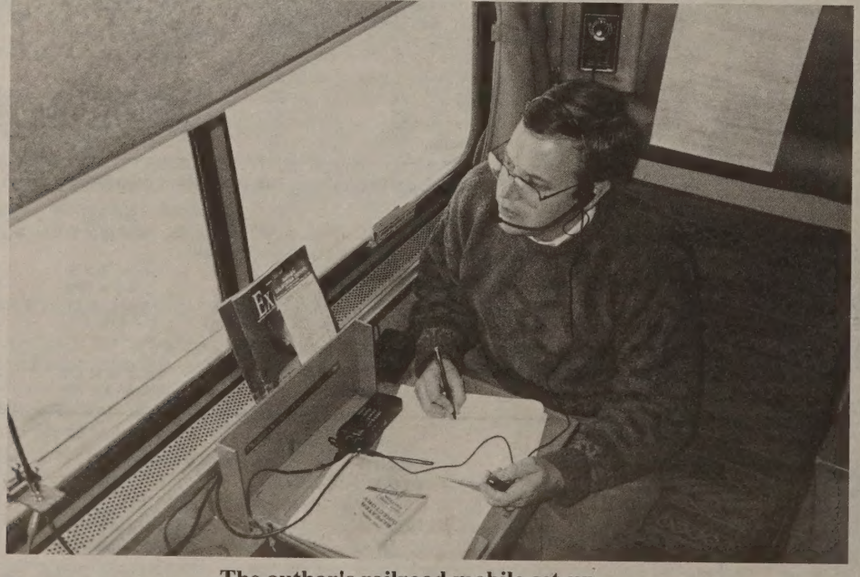
I didn't start operating until I was west of Philadelphia in the Slumbercoach room. I pulled down the foot of the bed, plugged in the AC adapter, and attached the speaker mike and an earphone to my Kenwood TH-77A. Even with a private room, you should use an earphone. That complies with Amtrak's rules, and is common courtesy.

The antenna was my 140/440 Comet 18" rubber ducky, attached to a modified radar detector suction cup mount. The antenna went right in the middle of the window. For the life of me, I have no idea what that antenna's pattern looked like (Rorschach's worst nightmare?), but you can't expect too much. Remember, you're in this long steel box with a row of holes poked down each side, and all of its own electrical noise. As a result, you should only count on talking through repeaters on your side of the train. You may get a repeater on the other side to come up, but you'll probably not be able to converse.

This is the reason for some of the preplanning . . . unless you're an old hand at trains, you probably won't know which side of the train your room will be on. With less than 180 degrees of propagation (with that



Two meter window mount antenna.



The author's railroad mobile set-up.

Riding Amtrak

Despite being the butt of congressional jokes and oft-repeated (and embellished) second/third/fourth-hand horror stories, Amtrak really is a nice way to go. Every year they've been making steady progress towards weaning themselves from the federal dole, while at the same time improving the quality of service.

Although there are several ways to ride Amtrak, radio amateurs are going to be most interested in some kind of private accommodations. That allows us to pursue our hobby at all hours of the day and night, without bugging our fellow passengers.

Vacation Packages

New in 1991 was Amtrak's Air/Rail plan, operated with United Airlines. This allows you to rail one way (with stopovers), and fly the other. Prices are very good, and if you are trying to squeeze a coast-to-coast trip into two weeks, you won't spend most of your vacation time getting there and back.

Accommodations

The downside of the Air/Rail package is that it covers coach seating only . . . but you can upgrade. On the East Coast routes, you have two choices: First Class bedrooms, or Slumbercoach compartments. With a bedroom comes more room, all meals during your trip, and access to the First Class lounges (very nice!) at Washington, D.C., Philadelphia (later this year), New York, and Chicago. Slumbercoach rooms are available for significantly less, and still provide a private commode, and that all-important 120 VAC outlet. Ask for a lower Slumbercoach room, since it has better storage arrangements, and you can fold the foot of the bed out and lounge about quite comfortably. Out West, the superliner cars offer four different bedrooms, including one family and one special (disability access) bedroom on the lower level. These last two types of room are larger and occupy the whole width of the car. (The East Coast "Heritage" cars also offer handicapped access rooms.)

Reservations/Availability

Right now, Amtrak has a car shortage. On the East Coast, you see their "Heritage" class cars, which were inherited from the private railroad passenger fleets when Amtrak formed in 1966. Out West, the two-level "Superliner" cars ply the popular routes. Efficient and comfortable, there just aren't enough "Superliner" cars to meet demand, especially for bedrooms on the long-distance runs. Starting in 1993, new "Viewliner" cars (East Coast routes), and "Superliners" (Western and a few Eastern routes) will be coming on line, easing the tight reservations situation. If you are looking for a bedroom on a long-distance Western run, you will probably have to reserve months in advance if you plan on traveling during the summer. I tried from May to get a post-Labor-Day economy bedroom from Chicago to Sacramento. I changed vacation plans to mid-October, and finally got a reservation in late August, only by shifting my plans one day.

Service

Amtrak's First Class service means there is someone whose job it is to make your trip comfortable. Luggage gets stowed, beds are turned down at night and made up in the morning. Also in the morning—the aroma of freshly brewed coffee just down the passageway in your car. You can even have your meals brought to your room.

Power

The 120 VAC outlet is described in Amtrak's literature as being for shavers only. I took that to mean any low power device, and hope you do, too! An A/C converter for my HT (1 amp output) is all that I'd ever want to plug in. Whatever band you are operating on, and whatever your power source, limit your output to 4 or 5 watts, MAX! Excessive RF, bouncing around in those stainless steel cars may pose a health hazard, and may interfere with Amtrak's (and the railroad whose tracks you are running on's) safe operation.

Antenna

The rubber ducky in the middle of the window is about as good as you are going to get . . . unless you plan on using your own private rail car. If possible, test your antenna before the trip. This is both to ensure you're going to get the most out of your rig and to lessen the odds of interference.

Information

For reservations and information, dial (800) USA-RAIL. Ask for a copy of Amtrak's national rail schedule, and their booklet "Amtrak's America." The booklet includes more information on the Air/Rail package. You can also visit your local travel agent, but some of them are not too knowledgeable about the Amtrak packages.

Enjoy your trip!

aiming complicated by the curving path of the rails), you have less than half of the repeaters in any area available to you.

The Contacts

So there I was in the shack . . . atlas, repeater guides, HT, logbook, and speaker mike. Right away, I figured out I didn't have enough hands. But I started making a few contacts, which was the point, anyway.

"CQing" might sound a bit much for 2 meter and 440 repeaters. Some of the books advise you, when calling into repeaters, to just say, "This is N2WRU listening." Fine if you're on home turf. But if you're in foreign repeater country, you've got to make it very clear who you are and what you're doing. Also, you can't count on working any repeater too long. Hills, other trains, underpasses, trackside buildings, curving tracks, lousy propagation patterns, etc., all conspire to make things difficult . . . hence the call at the start of this article. However, calling in your QTH as a train does pique a fellow ham's curiosity ("Now let me get this straight . . . you're calling from a train?"). So although the audio quality left a little to be desired, there were some hams out there who put up with me, and we had some nice rag-chews. Going through Ohio early in the morning, I was told that there was some hum creeping into my signal. Together we decided a ground from the antenna base to the train might not hurt. That, combined with my not having enough hands, set the agenda for a logistics run during the layover in Chicago.

Once we arrived, I made tracks for Amtrak's First Class lounge. A check of the yellow pages found a Radio Shack and a ham store within walking distance of the subway. A packet of alligator leads from the "Shack" and a headset from Erickson Communications, and I was ready to head west.

Westward on the California Zephyr I was in an economy bedroom on the upper level . . . big windows, two facing chairs, and a fold-out table. The antenna found itself on the (bigger) window again, but this time with a wire clipped between the miniground plane on my mount and some metal trim in the compartment. (Later contacts said no hum.)

Contacts got a little sparse the next morning, until we got close to Denver. There was a layover as the "Pioneer" part of the train was separated, and we picked up three chartered private cars. Once in the Rockies, VHF dried up fast and remained that way until we came down Glenwood Canyon to Glenwood Springs.

Way out West, in Winemuca, Nevada, I heard some ham trying to get the Battle Mountain repeater (146.91). He identified himself as being in a private car . . . Hold it! This guy is on MY train!

So Paul N6KWC and I made contact, and went to simplex. Paul was having the time of his life. He was on a charter trip in those three private cars the Zephyr had been hauling all the way from Denver. We had even worked some of the same repeaters, but neither of us knew another ham was aboard for almost 24 hours. We chatted on simplex for a while, until I could tell that Paul's batteries were starting to go, and arranged a face-to-face meeting in Sparks, Nevada, where the Zephyr refuels and one of the private cars (a sleeper no longer needed) would be taken off.

Well, my accommodations were OK, but if you really want to go First Class, try one of these private charters. The showcase car was the "Virginia City." Plush, with a gourmet cook thrown in for good measure. Also attached was a former Santa Fe dome car, with an opulent dark wood and brass bar/lounge on the lower level. Paul had been working his HT (on batteries) in the dome. Although hardly ideal, he probably had a better shot at repeaters on both sides of the train . . . and what a way to go.

When Nobody Answers

Especially out West and deep in the mountains, you'll hit some dead spots where you just can't seem to raise a repeater (or anyone on one). Don't worry. This is supposed to be a vacation! Enjoy the sights from your moving picture window . . . I know of no better way to really see America.

Catch up on some reading (including the comprehensive route guide provided on some trains). Meet some new people. Take a nap. Enjoy your meal. The train provides a great way to relax. Being able to reach out and talk to some fellow hams along the way is the icing on the cake.

Your portable shack list:

- HT
- Headset (or speaker mike with earphone)
- AC-to-DC converter
- Long rubber ducky with windowbracket and ground
- Battery pack for HT (i.e. one that uses AA cells, just in case the AC power goes off)
- Amtrak timetable
- *Railroad Atlas*
- *ARRL Repeater Directory*
- *Repeater Mapbook* (published by Art-Sci)
- Logbook, pencil

RF

Contact Larry J. Clark N2MOS at 207 Mather Ave., Princeton NJ 08540.

Why CW?

by Ken Gledhill N7TXG

Whenever I mention the code in conversation with other new hams (or would-be hams), I get the same response: "I have a mental block against the code . . . I just can't learn it." If this comment sounds a familiar tone in your ear, then this article is written for you.

First, let me make it abundantly clear that I am not against the no-code license. In fact, what I have to say will be of particular interest to many of these new colleagues of ours. This isn't just another article on how to learn Morse code. It focuses on why you should want to learn the code. It will help you to have a more positive attitude toward CW operation. With this improved perspective, you will find learning the code much easier. This article is aimed at helping you to understand and appreciate why many hams continue to operate on CW long after they've earned voice privileges. I hope to help change your point of view from seeing the code as a monumental barrier to viewing it as an enjoyable end in itself.

My Ugly CW History

I became interested in ham radio at an early age, but I put off actually learning the code until I was in my twenties. When I finally got around to taking my first FCC license exam, it was in an old austere National Guard Armory building in Salt Lake City. As is true with most first-timers, I was very nervous. Perhaps I was a bit more nervous than most applicants because I was trying to pass the 13 wpm code test without having first passed the 5 wpm test. Like many beginners, I didn't like CW and I didn't intend to operate using it once I was licensed; therefore, I could see no reason to get my Novice ticket. (In those days Novices had no voice privileges on any of the bands.) I felt that I had suffered through enough code practice sessions to pass the exam, but that was about all. Well, I took a lesson in humility that day since I not only didn't pass the 13 wpm code test, I didn't even string enough letters together to get the 5 wpm certificate. The experience so embarrassed me that I spent the next 20 years trying to convince myself that it really didn't matter that I didn't have a ham radio license—I didn't want to operate a station anyway.

It seems that the advent of the no-code license was somehow key to my beginning to lose my fear of CW. Since learning the code was no longer mandatory, the pressure to pass the test was gone. I could choose to take the code test if I wanted; and if I failed, I could still be licensed as a no-code Technician. At the prompting of my friends and family, I finally mustered up courage enough to take the 5 wpm (Element 1A) code test again. With the pressure off, I passed easily—with 100% copy. When my license finally arrived, I was really excited as I heard the rhythm of my new call coming back over the air. I found it to be even more exciting than my first 10 meter SSB contact. With the code as a friend, it was only a few months before I was ready to take Element 1B, the 13 wpm test.

As a part-time instructor at a local community college, I am able to watch the progress of many students each semester. I have observed that a person's success in any endeavor seems to be more dependent upon their attitude than upon their inherent ability. In my beginning computer programming classes, I have students that vary substantially in their ability and preparation for handling the coursework. However, when the final grades are posted, invariably the A's go to the most dedicated students and not to those who were initially most prepared. Likewise, my embarrassing lack of success with the code test those many years ago was more due to my poorly defined motives than it was to poor preparation.

A Link With the Past

Actually, there are a few disputes regarding whether Samuel B. Morse was really the first person to build a telegraph, but with reference to the code which bears his name, there is no doubt. In fact, it is hard to say what good the telegraph would have been without Mr. Morse's famous code to go with it. It would be like trying to run a computer without software.

It must have been about 1839 when Morse first developed the code, and it has stood the test of time for over 150 years. Even with the onslaught of the telephone, television and communication satellites, there are still millions of hams around the world who know and use the international Morse code on a daily basis. Even though there are a few excellent clubs for the telegraphers of yore, Morse code would now be little more than a curious historical oddity if it weren't for the amateur radio community's daily use of it.

At hamfests, museums and libraries, I look with awe at the inventions of the past: the tubes, massive coils of wire and other ingenious assemblies. Most of the units were handmade by craftsmen now long deceased. There are but a few real radio pioneers left in our ranks. Not many of us are capable of designing and building our own equipment anymore. Besides, commercial equipment is usually less expensive and more reliable. Nowadays, the home-brew rig is a rarity—even with the excellent components that we now have available.

It seems that Morse code is our only real tie to the radio pioneers of the past and to the equipment that they built and ran. It has become a part of the heritage of ham radio. It's our link with the radio's earliest beginnings.

The Language of Belonging

Because the amateur radio community seems to be the only large group of individuals that continues to regularly use Morse code, a comradeship has developed around it. It's like having our own language. When a ham, or would-be ham, passes any of the code test elements, they feel much more a part of the whole community of hams. Learning the code creates a feeling of success and belonging. I can still remember the feeling of fulfillment after passing the 5 wpm code test and then again when I passed the 13 wpm test. I felt like I finally really belonged to the ham community.

International Communication

I've seen advertisements for tapes and books that are designed to teach hams how to communicate with other hams in a foreign language. That's good. But, do you know how many languages it takes to work the 100 countries required to earn the DX Century Club award? I don't either, but it's a bunch. Fortunately, many foreign hams have learned enough English to get by with us here in the USA, but what about the others? Are you going to miss talking to them simply because you don't speak their language?

As a proficient CW operator, you can work other code stations where the operator doesn't know your native tongue by using the "Q" codes. We are all familiar with some of these codes, but did you know that there are really a large number of Q codes available and these can be used very effectively when communicating with individuals from other countries? A complete list of the standard Q codes is given in the ARRL's *Operating Manual.*

It's easy to use the Q codes. All that is needed is to send the appropriate Q code, followed by a question mark, when asking a question; and to respond, send the Q code (without a question mark), followed by your answer. For example, when "QTH?" is sent, it means, "What is your location?" and when "QTH TOKYO, JAPAN" is sent, it means, "My location is Tokyo, Japan." I keep a list on the wall near my station with all of the Q codes on it in alphabetical order. I have another list of the Q codes grouped by subject. I can look up any Q code quickly either way. If I am transmitting and want to ask a question that is a bit different from the usual ones I have memorized, I check the list of Q codes by subject. If I am receiving and encounter a Q code that I don't remember, the alphabetical list is easier to use.

Reduced Bandwidth

Often the biggest argument made in favor of using CW on the HF bands relates to conserving our available bandwidth. There are several assumptions that make relative bandwidth estimates between SSB and CW vary considerably. Theoretically, the minimum bandwidth required to pass a CW signal is very small—approximately 10 Hz to 50 Hz, depending on the rate at which the transmitter is keyed. Practically, however, the frequency separation between CW signals required to provide for single-signal reception is somewhat larger. A reasonable estimate for acceptable signal separation is 250 Hz, based on the design of most modern commercial CW receivers. In contrast, a similar criterion placed on SSB signals mandates that they be separated by approximately 2700 Hz.

A simplistic example using our 40 meter band will illustrate this point. Even though it would never really happen, suppose that on one particular evening all of the transmitting stations on the 40 meter band cooperated to the extent that they were perfectly stacked, one next to the other, all across the band. Let's assume that they are spaced at exactly the minimum separation for single-signal reception, as described previously. We can now calculate the number of SSB QSOs that would be running under those circumstances, and compare it to the number of CW QSOs that would be in operation at the same time. Considering the SSB case first, by dividing the 150 kHz of available SSB bandwidth by the 2700 Hz required for each separate QSO, we find that up to 55 QSOs would be taking place simultaneously. However, by considering the 150 kHz allotted for code work, we discover that there would be nearly 600 CW QSOs taking place at the same time. In other words, CW signals can be spaced 10 times closer to each other than can SSB signals without causing interference.

Intelligibility

CW seems to also edge out voice communication in the area of intelligibility. As was previously mentioned, the bandwidth required for reliable SSB voice communication is approximately 2700 Hz. The larger bandwidth is required to allow the fundamental and the first few harmonic tones from the operator's voice to be passed through the system to the listener. The mechanism by which our brains are able to distinguish among spoken sounds relies heavily upon the harmonic content of the words that we hear. For example, the spoken words "knock" and "talk" are distinguished more by their harmonic frequency content than by their similarly fundamental frequencies.

It is particularly difficult to distinguish between similarly sounding spoken words in the presence of noise. I probably don't have to tell you that noise is common on our crowded HF bands. The frequent difficulty with understanding spoken words in a noisy environment is main reason that the alphabet has been given standard phonetic words which may be used to help spell out all or part of a verbal message. (For example, my call is N7TXG, but I usually have to say, "November Seven Tango X-ray Golf" if I am to be understood on SSB.) Add to this confusion the frequent effects of regional and foreign accents, and weak-signal verbal communication is almost halted on noisy bands. I recently had to break off a potentially wonderful voice QSO with an Argentine ham simply because I could not understand him—even though I could hear him reasonably well. We tried both English and Spanish, but the signal-to-noise ratio was too poor for intelligible conversation. That wouldn't have happened with CW.

No harmonic content is required to fully understand a code message. CW is made only from a single on/off keyed fundamental tone. These pure tones are much easier for the ear and mind to distinguish in a high noise environment than are the subtle harmonic nuances required for effective verbal communication. In critical situations, you can mentally separate a desired CW signal from a closely located interfering signal simply by concentrating on the single CW pitch that you want to hear. Your mind can function as a type of selective audio filter under these circumstances.

Simple Design and QRP

One of the main reasons that I got into ham radio was to have an excuse to build some electronic "stuff." A few hams make, or would like to make, some of their own equipment, but few really have the facilities to design and test sophisticated equipment. The general configuration of CW equipment makes it much easier than voice modulated equipment to build, check out and put on the air. For example, a minimal SSB transmitter has at least five stages, but an elementary CW transmitter can be built using only a single oscillator stage. CW operation affords the opportunity for the construction of other useful projects as well. CW receivers, keyers, audio filters and automatic decoders can be built with reasonable ease.

The relative simplicity of CW equipment also renders it particularly suited for portable and/or QRP use. With the high efficiency of the transmitter's class C output circuitry, the majority of the consumed battery power is converted directly into transmitted RF power. When the key is down, full output power is applied to the antenna. When the key is up, no power is consumed by the output stage.

Quiet QSOs

With my large family, I find that I have to use the cracks or "white spaces" in my schedule to log a few QSOs. Much of my operating takes place in the wee hours of the night when my family is asleep—and would like to stay that way. It is particularly annoying to be awakened by an endless list of beeps, acronyms and callsigns. Of course, headphones can be used to eliminate the blare from my station's speaker, but I have no way to avoid speaking aloud into the microphone when operating voice. With CW, the external noise problem goes away. The communications can be kept completely silent in both the receive and transmit modes. The transmitter's sidetone is conveniently sounded in the headphones.

Computer Interface

While operating CW is a tie with the past, it is also as new as tomorrow. CW is really just a digital code. There are several commercially available devices (both hardware and software that can be used with your home computer) which will perform the task of sending and receiving CW. Usually, all that is required is a small module which provides a TTL interface between the transceiver and the computer. A standard serial I/O port is often used to support the communications between the computer and the I/O module. Some computerized CW decoding programs can adjust themselves to automatically follow the speed of an incoming signal. The decoded characters are usually printed directly on the computer's video

(Continued on page 30.)

A 2m Antenna for the Perfectionist

With considerable details.

by Douglas E. Marquardt WB2AWG

Having recently received my Technician license, I started my ham station with a 2 meter Heathkit 202 transceiver. I decided to build my own aerial and, after comparing the many different 2 meter aerial designs, settled for the vertical 5/8-wavelength ground plane antenna. This setup gives a power gain of almost 3 dB, as opposed to the 1/4-wavelength vertical, and is easy to construct, allowing omnidirectional communication.

Many articles have been published in amateur journals on antenna construction, but many just supply cookbook construction recipes, often without telling you how the various measurements of wire, etc., were obtained. Furthermore, you are at the mercy of the author's parts list. Because of this, I designed my own 5/8 wavelength antenna and, through the equations presented here, modified my construction to go with the materials I had on hand. You, too, can build this (design it) around your junk box, modifying things to suit your own list of materials for construction.

Where the Numbers Come From

Since 1/2 wavelength = 468/freq. in MHz, by simple ratios, 5/8 wavelength = 585/freq. in MHz. For 147 MHz, the wavelength = 3.979 ft. or 47.75 in. This is the vertical radiator length.

The ground plane reflectors are 1/4 wavelength at the lowest frequency). Since 1/4 wavelength = 234/freq. in MHz, for 147 MHz, 1/4 wavelength = 1.5918 ft. or 19.1 in. This is the horizontal reflector length.

Since we are matching the antenna to an RG-58/U coaxial cable (transmission line), we need a loading coil to match this impedance (approximately 52 ohms). Then X_L = 52 ohms, or, at 147 MHz, $X_L = 2\pi$ (freq. in MHz)(L) = 52 ohms; L = 52 ohms/2 π(147 MHz) = 0.05629 µH. Note: Make the coil inductance 0.06 µH to allow for trimming.

Using the equation for a free-air solenoid coil, $L = a^2n^2/9a + 10b$, where a = coil radius in inches, b = coil length in inches, and n = coil turns/b. Solving for n:

$n = \sqrt{L(9a + 10b)}\,/a^2$.

Here is where one can modify the coil to any desired specification. Since I had a lucite rod of a = 0.75 in. and b = 2 in., my design proceeded with n being calculated to equal 2.25 turns/2 in. Again, for adjustment and trimming, I made n = 2.5 turns/2 in. and picked #14 AWG enameled copper wire for the coil, although almost any large guage wire will do (10-15 AWG).

My design followed that shown in Figure 1. Construction is not critical, since final trimming gives the lowest SWR. Incidentally, adjustment of the coil will compensate for slight variations in the radiator length, but don't exceed the calculated maximum value.

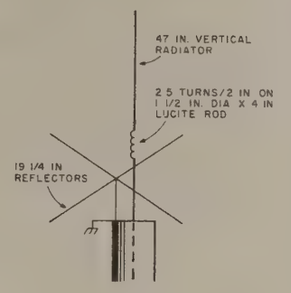


Figure 1.

Construction

Since construction is not critical, parts are either your own junk-box variety or those listed in the parts list.

The construction of the antenna is shown in Figures 2 and 3. Details of the construction will not be given here, since construction always depends on materials on hand and the ingenuity of the person doing the building. However, complete details of this construction and parts availability will be gladly furnished on request.

Tuning

I used a 2m transceiver for final tuning and a VHF wattmeter to adjust the antenna to the lowest SWR. Tuning was accomplished by adjusting the spacing between the coil windings until an SWR of about 1:1 was obtained. In some cases, 1/2 to 1 turn of the coil wire may be needed to be added or subtracted from the original coil winding to achieve the lowest possible SWR.

In a ground plane installation, the position of the reflectors will affect the SWR obtained. Therefore, if necessary, the reflectors may be bent down at about a 45 degree angle and slowly moved upward to again obtain the lowest SWR reading possible.

Final Comments

In my construction, it turned out to be unnecessary to bend the reflectors down on an angle. Also, a clear dope was used to seal the coils in place, once they were adjusted for the lowest SWR reading.

As I originally stated, the main purpose of this article was to show you where some of the numbers came from in the design of a 5/8-wavelength antenna. Thus, this allows you the freedom to modify the design to the materials you have at hand. RF

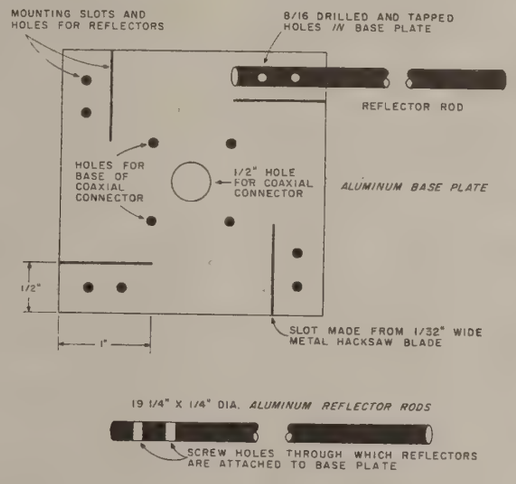


Figure 3.

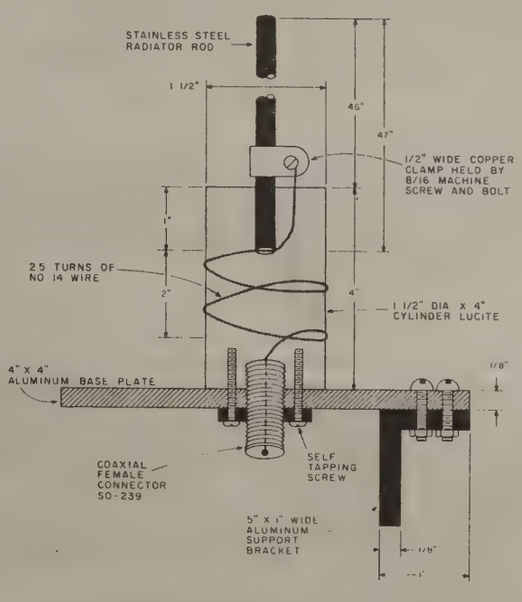


Figure 2.

Parts List

1 47" stainless steel rod for the vertical radiator (or 1/4"-diameter aluminum rod)

4 19-1/4" long x 1/4" diameter aluminum rods for the reflectors

1 4" x 4" x 1/8" base plate of aluminum

1 1-1/2" diameter x 4" long rod of lucite (or equivalent)

#14 AWG copper enameled wire

1 SO-239 coaxial connector

assorted self-tapping screws

1 5" x 1" x 1/8" aluminum support bracket

Reprinted from the March 1978 issue of 73 Amateur Radio.

Contact Douglas E. Marquardt WB2AWG at 1405 Phelps Ave., San Jose CA 95117.

Computerized Global Calculations

Finding the best way to Pago Pago.

by Carl Wagar VE3EKR

When you're working that rare DX in Timbuktu, it's always nice to drop a tidbit of information like, "I calculate that our QSO spans a distance of 8,346 kilometers, QSL?" Pretty impressive-sounding information, no doubt, and it's a novel topic for conversation.

After a while, though, you can become tired of doing all of that number-crunching every time. No doubt some of you have let the bit bug bite. Either you have picked up some type of microcomputer or you are at least interested in them. If so, let the number-crunching bother you no more. Let the computer do it!

This article describes a computer program that calculates the shortest distance between any two points on the globe. All you need to do is type in the latitude and longitude of any two locations on earth, and it prints out the distance in miles and kilometers.

I call the program GLOBAL, for obvious reasons, and it is written in the programming language BASIC. GLOBAL is listed in Figure 1. It is very straightforward and takes very little time to run. In Figure 1, statement numbers 40 through 90 have the computer ask you to input information about your location or the location of the first station. (If you are holding a three-way QSO, you could tell the other fellows how far apart they are.) Statements 100 through 180 calculate the parameters for the first station. Your station can be located anywhere in the world. So, if you're not in North America, you can still use the program. Statements 200 through 250 ask you questions about the second station's location, and statements 280 through 370 calculate the parameters for his location. The actual calculation of distance is carried out from statement 390 through 410, and then the distance is output in both miles and kilometers.

One important point is that GLOBAL converts degrees to radians before calculating. Make sure that your version of BASIC uses radians for angle calculation. If your BASIC needs degrees, then you'll have to eliminate the conversion factors (3.14159/180) from statements 110, 120, 280, 290, and 410, and you'll have to change pi (3.14159) to the value 180 in statements 340, 350, and 400. One last thing you should know is that part of statement number 400 reads like this: SQR(1-A1^2). The A1^2 means A1 to the exponent 2, or A1 squared. Some machines may need that written A1**2, or, if all else fails, just multiply A1 by itself (A1*A1). So with these hints in mind, you should be able to get GLOBAL to perform for you, no matter what kind of BASIC your machine eats.

Figure 2 shows the output for two different runs of the program. These two runs are identical with the examples that Frank Kelly W2IAT gave in his article, "Global Calculations for the DXer", which appeared on page 68 of the August '76 issue of *73*. The first run calculates the distance between Huntington, Long Island, New York (40°52'N., 73°19' W.), and Paris, France (48.52° N., 2.2° E.), as a total of 3,596 miles, which is the same as Kelly's figure. The second run calculates the distance between Huntington and Rio de Janeiro, Brazil (22.54° S., 43.15° W.), as 4,794 miles, again the same as in Kelly's calculations.

If you get tired of typing in your location, you can always calculate L1, L2, K1, and K2 from your location and assign these in the first statements of your program. You could then eliminate statements 40 through 180. By the way, GLOBAL takes up very little space in memory, less than 1K, and the above measure would reduce it even more. RF

Reprinted from the December 1977 issue of 73 Amateur Radio.

```
5 CLS
10 PRINT "This is Global"
20 PRINT "  "
30 REM ** Input Data for Your Location **
40 PRINT "MY LOCATION IS:"
50 PRINT "Latitude (Deg, Min, 'N' for North or 'S' for South)"
60 INPUT L2,M2,Y$
65 IF Y$="N" OR Y$="n" THEN Y=1 ELSE Y=0
70 PRINT "Longitude (Deg, Min, 'W' for West or 'E' for East)"
80 INPUT L1,M1,Z$
85 IF Z$="E" OR Z$="e" THEN Z=1 ELSE Z=0
90 PRINT " "
100 REM ** Calculate Constants for Your Location **
110 L1=(L1+(M1/60))*3.14159/180
120 L2=(L2+(M2/60))*3.14159/180
130 K1=SIN(L2)
140 K2=COS(L2)
150 IF Z=0 THEN 170
160 L1=-L1
170 IF Y=1 THEN 190
180 K1=-K1
190 PRINT " "
200 REM ** Input Data for Distant Station Location **
210 PRINT "DISTANT STATION LOCATION IS:"
220 PRINT "Latitude (Deg, Min, 'N' for North or 'S' for South)"
230 INPUT L4,M4,B$
235 IF B$="N" OR B$="n" THEN B=1 ELSE B=0
240 PRINT "Longitude (Deg, Min, 'W' for West or 'E' for East)"
250 INPUT L3,M3,A$
255 IF A$="E" OR A$="e" THEN A=1 ELSE A=0
260 PRINT " "
270 REM ** Calculate Constants for Distant Station **
280 L3=(L3+(M3/60))*3.14159/180
290 L4=(L4+(M4/60))*3.14159/180
300 IF A=1 THEN 330
310 C1=ABS(L1-L3)
320 GOTO 340
330 C1=ABS(L1+L3)
340 IF C1<3.14159 THEN 360
350 C1=(2*3.14159)-C1
360 IF B=1 THEN 390
370 K1=-K1
380 REM ** Calculate Distance **
390 A1=(K1*(SIN(L4)))+(K2*(COS(L4))*(COS(C1)))
400 D=(3.14159/2)-(ATN(A1/(SQR(1-A1^2))))
410 D=69.15*180*D/3.14159
420 PRINT " "
430 REM ** Print Output **
440 PRINT "Distance in Miles      = ";D
450 D1=1.6093*D
460 PRINT "Distance in Kilometers = ";D1
470 END
480 END
```

Figure 1. Program listing for GLOBAL.

```
This is Global

MY LOCATION IS:
Latitude (Deg, Min, 'N' for North or 'S' for South)
DEG: 40,52,N
Longitude (Deg, Min, 'W' for West or 'E' for East)
DEG: 73,19,W


DISTANT STATION LOCATION IS:
Latitude (Deg, Min, 'N' for North or 'S' for South)
DEG: 48.52,0,N
Longitude (Deg, Min, 'W' for West or 'E' for East)
DEG: 2.2,0,E


Distance in Miles      = 3596.772
Distance in Kilometers = 5788.285
(Huntington, NY to Paris, France)
```

```
This is Global

MY LOCATION IS:
Latitude (Deg, Min, 'N' for North or 'S' for South)
? 40,52,N
Longitude (Deg, Min, 'W' for West or 'E' for East)
? 73,19,W


DISTANT STATION LOCATION IS:
Latitude (Deg, Min, 'N' for North or 'S' for South)
? 22.54,0,S
Longitude (Deg, Min, 'W' for West or 'E' for East)
? 43.15,0,W


Distance in Miles      = 4793.848
Distance in Kilometers = 7714.740
(Huntington, NY to Rio de Janeiro, Brazil)
```

Figure 2. Two runs for GLOBAL. The first calculates the distance between Huntington, Long Island, New York, and Paris, France. The second calculates the distance between Huntington and Rio de Janeiro, Brazil.

Hamfest Shopping

The Murphy Method.

by Stuart Stephens K8SJ

As a veteran hamfest dealer and shopper I have read with interest recent articles about purchasing used gear: an account of how to take another ham to Small Claims Court, and a detailed list of testing procedures for suspect gear. I offer a third alternative: The Murphy Method of Hamfest Shopping. This is a correlation of Murphy's Law ("A thing that can possibly go wrong, will.") simply stated: "All gear offered at a hamfest either doesn't work or doesn't work very well." The Murphy Method is: The final sales price should take into account the cost of repair.

The Case Studies

Case Study One: the Hamburg (New York) Hamfest, 10 years ago. Late the night before the hamfest, I pulled up and parked my wagon-trailer combo by a large, rollicking RV. The friendly guys invited me in for a round of brew and conversation. Part of their wares was a recent-vintage linear. Seems that at a sudden stop on the interstate the linear, stored unsecured on a top shelf, had done a two-and-a-half-gainer dive onto the floor, an eight-foot drop. The next morning, to the question, "Does it work?", I heard the truthful reply, "Sure, the last time I plugged it in . . . "

Case Study Two: a different hamfest. One bemused fellow told me how he was going to trade a transceiver for a vintage transmitter: "Of course it works!" When the offered rig seemed a little light, he unscrewed the cabinet for further inspection. The power transformer was gone.

Case Study Three: the Rochester (New York) Hamfest. In the quiet evening I talked with a tube merchant, trading secrets. "Do you check them?" "No, I simply don't have the time. I guarantee to replace them, but I don't check them." True to his word, if you return the tube, you will get another, also unchecked.

Beating Murphy

We hams have a choice of being mad or being smart. Being mad is expecting perfection from the stranger sitting behind the table, strewn with eight-track tapes, his wife's Styrofoam™ Christmas ornaments, and cabinets with suspicious waterlines six inches up. Being smart is joining in the spirit of the human adventure, expecting a foxhound bargaining ritual, and never parting with more coin than would prevent you from saying, "Even though it might not work, I can fix it," with a smile.

To practice the Murphy Method, I offer the following guidelines:

1. Know in advance (even carry the list with you) the retail prices of used pieces of gear. The retail stores are different; most do check the gear and offer a limited guarantee. All offer facilities to light-up the rig before you buy. The retail price is the top price. You know you can get the piece, guaranteed, at this price—any hamfest price should be significantly lower.

2. Walk away (politely) from anyone who will not bargain. Anyone hamfesting should know and abide by the rules of the game. Dickering is not only the rule, it's what makes it fun. Assume that all hamfest prices are inflated to include room to come down.

3. Any piece of gear that comes with a manual or schematic is worth an extra look. You'll need them.

4. Be on the lookout for a spare-parts junk version of the unit you want. For a few dollars you'll have a grab bag of replacement pieces, especially the mechanical parts for which there may not be a substitute. Again, you'll need them.

5. Don't underestimate the two dollar, Day-Glo™ spray-painted bargain. My brother bought such a Globe Scout, replaced the filter capacitors and final tube, and it fired right up. Ugliest radio on the air.

6. Don't overestimate the two dollar, Day-Glo spray-painted bargain. I bought six Novice-style CW transmitters for $40. While all of them passed the smoke test, not one of them puts out a signal.

7. On the really major purchases—the rig that will become the centerpiece of your hobby—think seriously about both your pocketbook and your frustration level. Sometimes, the mint, working bargains do come down the road. Sometimes, we need to spend the extra dollars for retail used or new gear, to get exactly what we want. Generally, we get what we pay for. Figure your enjoyment and frustration levels into the price of a radio, and shop accordingly.

8. For the more expensive, specific-interest purchases, shop the classified ads of the radio magazines and sales sheets. You'll pay a bit more, but you'll have the advantage of a name, phone number, and address. The flip side is also advisable: If you need a higher dollar for a piece of gear, don't hamfest it, but sell it through an ad.

You'll find me at Dayton every year, the guy with the plywood tables that tip if you lean on them. If you ask, "Does it work?", I will truthfully reply, "I don't know," and "I have priced it accordingly." If you bargain accordingly you will have fun, pick up some nifty bargains, and lower your blood pressure by practicing the Murphy Method of Hamfest Shopping. RF

K9RKA and KA8LWR make a discovery.

Reprinted from 7/90 issue of 73 Amateur Radio. *Contact Stu Stephens K8SJ at 749 E. Prospect St., Girard OH 44420.*

try something new

by Bill Brown WB8ELK

Reading Schematics

The ability to read schematic diagrams will open up the world of electronic circuitry. A schematic is simply the "road map" of a circuit. Once you figure out the real-world device that goes with the abstract symbol used in schematic diagrams, and how they connect to each other, you'll find that it really is not all that hard to read them. The places where components attach to each other are represented by lines which either cross without making a connection (like a highway overpass), or make a connection (a road intersection). It may help you to understand schematic diagrams by replacing the symbols with drawings of their real-world components. This month I'll describe some of the more common individual component symbols and how to relate them to the real world.

Resistors

Resistors come in a large variety of values measured in units called ohms. The most common physical size is the 1/4-watt variety which consists of a small cylinder with wires on both ends. You will usually find a series of colored stripes on the body of the resistor which indicates the resistance value plus a tolerance percentage (the amount the resistance can vary from the specified value). See Table 1 for the resistor color code. To determine the value, read the color stripes from left to right (with the gold, silver or red stripe on the far right). The first two stripes are the first and second significant figures, the third color is the multiplier and the fourth one (usually gold or silver) is the tolerance of the part. For example, using Table 1, a color sequence of YELLOW,VIOLET, RED,GOLD is read as 47 X 100 = 4700 ohms (also referred to as 4.7k). The GOLD stripe indicated that the value may vary +/- 5%.

The symbol for a resistor in a schematic diagram is a zig-zag line. (See Figure 1a for the symbol and its real-world appearance). The function of a resistor is to limit (resist) the flow of electrons and hence the current that passes through it. A good analogy is that of a faucet on your sink. The higher the value of resistance, the less current that can pass (just like closing your faucet to limit the flow of water). Also, when current passes through a resistor, a voltage drop occurs as well. The ability of a resistor to control current and the voltage level across it are two very useful abilities for circuit design.

You do have to take into consideration that if the resistance is low enough, enough current may flow through the resistor to exceed the wattage rating of the resistor and it will burn out. If the schematic specifies a 1/2-watt or 1-watt resistor, you'd better not substitute a 1/4-watt part or smoke may fly!

Capacitors

Capacitors come in a mind-boggling variety of values and shapes. The three most common types are disc ceramics, electrolytics and tantalums. Both tantalum and electrolytic capacitors have a polarity marking on them and should be installed in only ONE direction in the circuit. A number of other capacitor types (such as the disc ceramics) are non-polar and can be installed either way. Capacitors consist of metal plates separated by a non-conductive dielectric material. By storing electrons on these plates, a charge is developed. (See Figure 1b and 1c for the schematic symbol for a capacitor and its real-world appearance). The capacity to store electrons is determined by the surface area of the plates and is measured in units called farads. This is a large value, so generally most capacitors are measured in units of microfarads (µF) or picofarads (pF). One microfarad is equal to 0.000001 farad and one picofarad is equal to 0.000001 microfarad.

Although sometimes the actual value is stamped on the capacitor, quite often you will see a cryptic three-digit number. The first two numbers are the first and second most-significant digits and the last number indicates the power of 10 multiplier. For example, if the number is 104 this means that the value of the capacitor is 10 X 10^4 (10,000). The final result of 100,000 is the value of the capacitance in units of picofarads. Capacitors with values over 1,000 pF are generally represented in µF. Since 1 pF is equal to 0.000001 µF, our value of 100,000 pF works out to be 0.1 µF. Likewise, a marking of 203 works out to be 20 times 10^3 pF. The final result of 20,000 pF equals 0.02 µF when divided by 1,000,000. See Table 2 for a chart of common values. Capacitors smaller than 100 pF are generally marked in the actual picofarad value. Large capacitors (1.0 µF or more) such as tantalums and electrolytics usually have the microfarad (µF) value marked on them.

You should watch out for the voltage rating marked on the capacitor. Although there is some leeway room, it's generally not a good idea to exceed the voltage potential on a capacitor because it might short out.

Next month we'll take a look at LEDs, ICs and batteries. RF

Resistor Color Code Chart

Color	Value	Multiplier	Tolerance
BLACK	0	X1	
BROWN	1	X10	+/- 1%
RED	2	X100	+/- 2%
ORANGE	3	X1,000	
YELLOW	4	X10,000	
GREEN	5	X100,000	
BLUE	6	X1,000,000	
VIOLET	7	X10,000,000	
GRAY	8	X100,000,000	
WHITE	9	X1,000,000,000	
GOLD		X0.1	+/- 5%
SILVER		X0.01	+/- 10%

Table 1.

Capacitance Value Chart

Marking	Value (µF)	Value (pF)
106	10.0	10,000,000
105	1.0	1,000,000
104	0.1	100,000
103	0.01	10,000
102	0.001	1,000
101	0.0001	100
100	0.00001	10

Sometimes the value is listed directly in pF (i.e. 100p).
Values above 1 µF are usually marked directly in microfarads (µF)

Table 2.

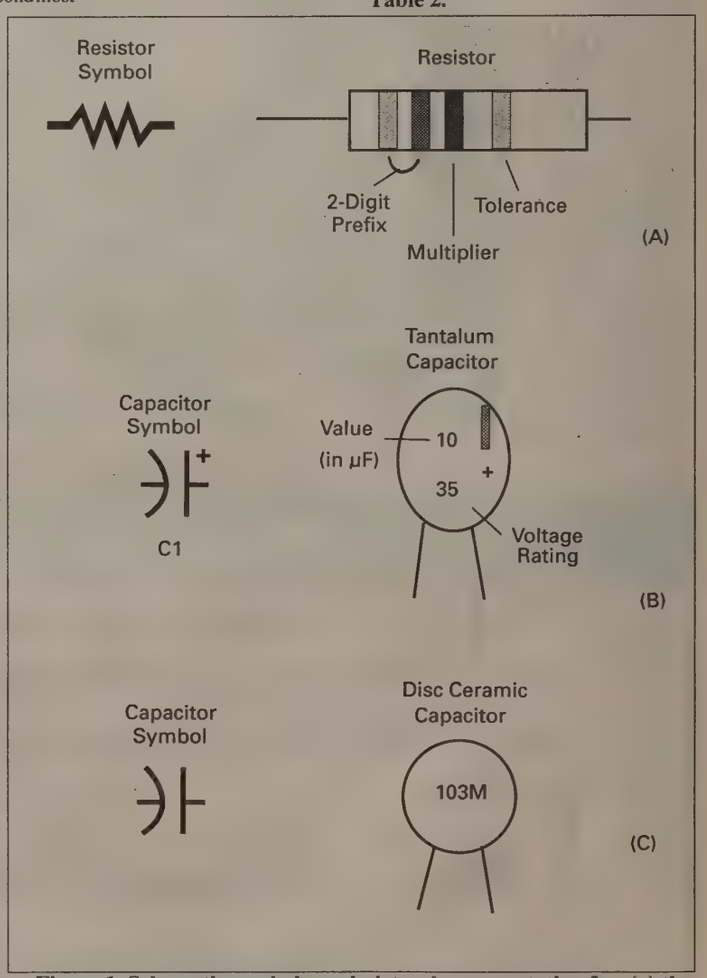
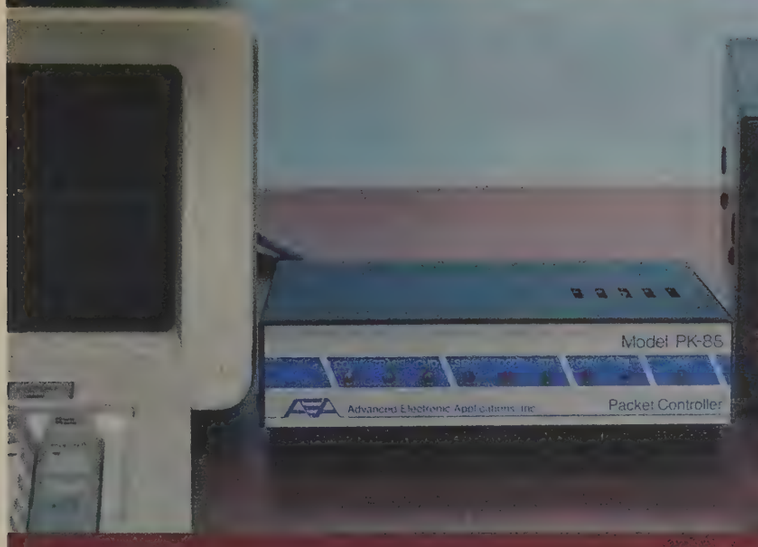


Figure 1. Schematic symbols and pictoral representation for (a) the resistor. (b) a tantalum capacitor. (c) the disc ceramic capacitor.

Now you see it....



The PK-88 is becoming one of the most widely used packet controllers in the world. In some areas, it is outselling its closest competitor by 10 to 1!

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RF review

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Oak Bay Technologies Rubber Duck Window Mount

by Bill Brown WB8ELK

Unfortunately, not every car in the world comes with an attached 2 meter antenna. Whenever I rent a car or ride in a friend's car, I'm stuck with nothing more than a 2 meter HT inside the vehicle. It doesn't take long before I'm outside of communication range with the local repeater and am forced to do the old "stick the HT outside of the window" trick. While effective, this exposes your HT (and your hand) to all sorts of inclement conditions. The wind chill factor during the winter while moving at 55 mph is sure to limit this activity! Not to mention the possibility of dropping your expensive HT and splattering it all over the freeway. Wouldn't it be great if someone made a device to mount your rubber duck outside of the car while allowing you to keep your HT comfortably inside?

The Rubber Duck Window Mount

The folks at Oak Bay Technologies have come up with just such a device. The Rubber Duck Window Mount (Model #AM101B) consists of a lightweight metal clip with a female BNC connector designed to slide right over the top of your car's side window. Six feet of mini-coax (RG-174/U) comes with the Window Mount, ending in a male BNC connector to attach to your HT. Just plug your HT's rubber duck antenna onto the Window Mount connector, hook up the coax to your HT, and you now have an effective *outside* antenna.

Road Test

I found that the metal clip fit snugly over the top of the window and slid neatly into the rubber gasket surrounding the car window when I rolled the window completely up. The rubber duck antenna ends up about an inch or so away from the outside of the window at a slight outward angle, which helps keep it away from the car's metal roof. The mini-coax flexes easily and fits through the window through a gap in the metal clip. The six-foot length of coax is plenty for most temporary installations. Although you can use any side window, I prefer to put the Window Mount on my back door window with the coax fed over the back of the front seat. That way the coax isn't in my way when I open the front passenger door.

Both of the BNC connectors have gold center contacts for excellent reliability. The coax connection to the outside connector is well protected from the elements with shrink wrap tubing. To keep the coax connections from breaking loose, the folks at Oak Bay have included a strain relief loop on the outside bracket and a flexible rubber boot on the male coax connector.

Impressions

My effective communications range improved substantially over what I could do from inside of the vehicle. Although the mini-coax is somewhat lossy at 2 meters, the advantage of flying your rubber duck outside more than makes up for the coax loss. Also, since the coax run is about six feet, the loss is fairly insignificant.

Installation has always been quick and easy for any of the cars I've tried, usually taking just a few seconds. It's a real pleasure to pack the Window Mount for travel. It wraps up into an extremely compact package and can be jammed into just about any "filled to the brim" suitcase.

I think you'll find the Window Mount to be the perfect traveling companion when you really need to communicate. RF

The Rubber Duck Window Mount.

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311	312	313	314	315	316	317	318	319	320
321	322	323	324	325	326	327	328	329	330
331	332	333	334	335	336	337	338	339	340
341	342	343	344	345	346	347	348	349	350
351	352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369	370
371	372	373	374	375	376	377	378	379	380
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upgrade . . . don't stop now

by Gordon West WB6NOA

Are you having a tough time getting that 5 wpm or 13 wpm code test passed? If passing the Novice or General class code test has been a frustrating experience, I have a couple of tips that may lead you to your next successful CW upgrade.

If you are preparing for your code test by simply listening to the eight different brands of Morse code cassette training tapes, it may be time that you switched over from metal oxide to Mylar and a permanent magnet. We may need to wean you off of the code cassettes and get you into a pair of headphones or "on-the-air" CW monitoring. Tapes are fine—but code tapes may sometimes give you a false sense of security when preparing for the upcoming code test. You think you are doing just fine, keeping up with the tape, but actually you may be fooling yourself because your brain already has the material pre-memorized. When the real code test comes down the line, it will be different than what is on the tape, and your code-passing efforts will be quickly shattered.

If you start copying on-the-air CW messages, you won't have a clue as to what's going to be coming next, and this is great practice in preparing for your upcoming code test. Tune into any type of CW that's out there, slightly faster than what you can reliably copy. Write down every letter, and then go back and see what you have copied. Maybe it's in a foreign language; maybe it is a government transmission of five-letter character groups—who cares, it's great experience to copy something when you have no idea of its content.

But try to copy ham QSOs. These will sound very familiar when you next take your Morse code examination.

"We make up our own QSO examinations," comments Marc Churgel KI6TU, a contact volunteer examiner for the W5YI VEC and also an ARRL volunteer examiner. "The code test for Novice, for General, and for Extra is a typical QSO from one ham to another. There are no deliberate misspellings—no strange cities—no tricky verbiage—just plain language with a few common abbreviations. When they listen to my test, it's like listening to code on the air," adds Churgel.

But how do you know how fast you are copying reliably? Tune into CW practice from W1AW and you will actually copy the speed that they are sending. W1AW CW practice is a terrific way to receive plain language text at precise speed intervals.

If you want to brush up on your numbers, try these frequencies:

8,680.1 kHz, upper sideband
12,728.1 kHz, upper sideband
16,528.1 kHz, upper sideband

Several times a day you will pick up CW transmissions from these powerful West Coast stations run by the government for weather facsimile transmissions. The code is normally sent at 15 wpm, and makes for great practice if you're planning on going for the General class code test. Tune in any time and listen for the CW broadcasts that pop up before and after the normal weather FAX broadcasts.

Okay, so you know you are copying at a good solid 13 to 15 wpm, and you are getting ready for the big CW test. Now it's time to contact your local VE team and find a testing team, a testing time, and a testing location that is convenient for you. You might want to ask the VE team whether or not they expect one minute of perfect copy, 10 fill-in-the-blank answers to 10 questions with a 70 percent pass rate, or are they giving a multiple-choice test based on the message you have copied down? You might also find out whether or not that one minute of perfect copy may be "cleaned up" after the code test ends with AR SK. Some examiners give you a few seconds to clean up your copy—others don't. Find out ahead of time!

When you are ready to sit for the 5 or 13 wpm code test, ask the volunteer examination team leader for permission to try the 20 wpm code test first. Most VE teams will give the code tests in the following order—first 20 wpm for Extra, then 13 wpm for General, and then 5 wpm for Novice. Most of the time, it's one test right after another.

If this is the case, indeed sit in for the 20 wpm, even though you are only preparing to take the 5 or the 13 wpm test. While the 20 wpm test is in progress, try to write down every living letter you can copy. Maybe your paper looks like alphabet soup—but nonetheless, you have a few letters and numbers down there. Your brain will love it.

Then, when they send you the 13 wpm test, it will sound relatively slow. You should copy it just fine if you have prepared for the General class code test.

But if you're going just for Novice, or Technician-Plus, first sit through the 20, then the 13, and by the time they get to 5 wpm, it will sound REAL slow! You will do just fine!

You know the feeling when you are out driving on the open road and then come up on a speed zone at 45 mph. It feels like you're going at a crawl. This is because you were going fast at first, and got used to it. Same thing for the code—if you put yourself through five minutes of CW at a rate a lot faster than you can reliably receive or have prepared for, when they slow it down it will sound extra slow!

So ask your volunteer examiners to first test you at 20 wpm. Even though you may be only going for 5 or 13 wpm, five minutes of 20 wpm will make everything else sound slow. It works.

Good luck on your next CW upgrade. RF

W5YI VEC examiner Marc Churgel KI6TU (left) congratulates a handicapped applicant on passing her code test. VE Lloyd Harwood (right) looks on.

The Ten Meter Special

Build this inexpensive vertical antenna.

by Alan Kaul W6RCL

Ten meters is a funny band—not funny, ha-ha, but funny, peculiar. Sometimes it "opens" to what sounds like everywhere. Sometimes it isn't "open" at all. And, occasionally, when it is open, it is open only in one direction. To take advantage of the band's peculiarities of propagation, you need an antenna which will give you a low angle of radiation and an omnidirectional pattern. If you have a beam sitting on top of a 70-foot tower, that's terrific, because the parasitic elements and the height above ground give you the radiation pattern you want and the antenna rotor provides the 360 degrees of versatility.

But if you don't have any of that, consider this: a rooftop ground plane which is wind resistant and can be built from scratch with new parts very inexpensively. The vertical polarization gives you the low angle of radiation needed for long skip, but it won't cause cross-polarization problems when working DX because the signal tends to get unpolarized when it bounces off the F-layer. The vertical polarity will also help with local QSOs when working from your base to someone else's mobile (most, if not all, 10 meter mobile rigs are used with vertical antennas). If you're not able to work 10 meters because of equipment problems, this antenna might help make up your mind if you've been thinking about converting a CB radio to 10m, *73* has published several CB-to-10 conversion articles since the first one appeared in May 1977).

The construction of this antenna is simple. The only tools you'll need are a hacksaw, screwdriver, soldering iron, and wire cutters. Installation is simple, too. This antenna uses a commercially-available mounting bracket (I'm using a plumbing vent pipe mount which I bought for my TV antenna at a hardware store, but a chimney mount or eave mount would work equally well). The antenna will handle several hundred watts PEP, and, if constructed to the proper dimensions, you can expect a standing wave ratio of less than 1.5 to 1 (mine is below 1.5:1, between 28.5 and 29.0 MHz). While this particular antenna is designed for 10 meters, the same basic pattern can be used on 15 meters using the same size diameter tubing. If you want to design a similar antenna for 20 or 40 meters, I'd recommend doubling or tripling the diameter of the tubing for strength and placing nylon guy ropes near the top of the completed antenna for stability.

Construction

Everything you need for 10 meters is shown in the parts list.

Construction is straightforward. The aluminum radiator slips inside the PVC tubing and is held in place with the two stainless steel screws. The self-tapping screw goes through the PVC insulator into the aluminum near its bottom end, and the coax center conductor attaches to the self-tapping screw. The radials are soldered together at one end and affixed to the PVC base tubing with the hose clamp. The coax ground braid is soldered to one of the radials. If you want to get the antenna aluminum tubing more than a foot or two above the roof, the radials should be tied down firmly as guys. If you want to put the antenna even higher—8 to 10 feet above the roof—I'd recommend you invest in an inexpensive television antenna mast of the same inside diameter as the outside diameter of the PVC. Slide the PVC inside the mast and fasten it using two more stainless steel screws.

The angle at which the radials meet the base insulator will have an effect on SWR. If the radials drop vertically from the radiator, the antenna essentially would be a vertical dipole and a good match would be obtained with 72 ohm coax. An angle of 40 to 50 degrees should be a good match for 52 ohm coax. As the angle approaches 90 degrees, the impedance of the antenna decreases and the mismatch is reflected in an increasing SWR.

That's all there is to it. The rest is in Figure 1. Oh, yes, one more thing – the last time I wrote an article, I received 35 inquiries requesting more information. I'll be happy to answer all letters, but only if you send a self-addressed stamped envelope.

See you on 10. RF

Reprinted from the September 1978 issue of 73 Magazine for Radio Amateurs. *Contact Alan Kaul at 4275 Beulah Dr., La Carada - Flintridge, CA 91011.*

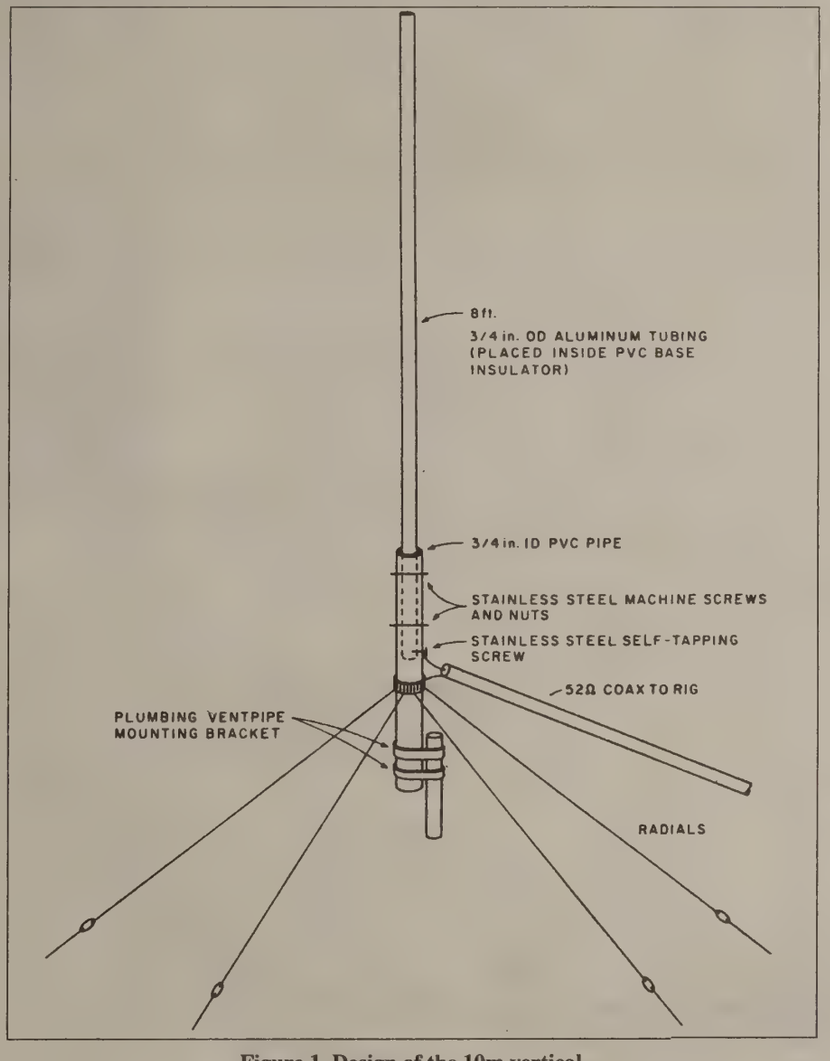
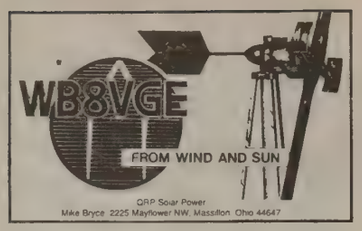


Figure 1. Design of the 10m vertical.

Parts List

One piece of aluminum tubing (8' x 3/4" outside diameter)
One piece of PVC pipe (any length x 3/4" inside diameter—doublewall is recommended for strength)
Two stainless steel screws with nuts and washers (8 x 32/1-1/2" works fine)
One self-tapping sheet metal screw
One automotive-type hose clamp (1 1/2" inside diameter)
Four 8'8" lengths of copper wire for radials (copperweld or similar if vertical element is sufficiently above the roof, requiring the radials to double as guy wires)
Four strain insulators
One piece 52 ohm coax, any length to transmitter
One installation bracket, your choice



radio magic

by Michael Bryce WB8VGE

Building a Worktable

Like most hobbies, ham radio will take up some room in the house. You'll need a place to work and tinker as well as play radio, without setting up and tearing down with each session. The kitchen table is out! What you need is a table that's big, solid and can be put together without a loan from the World Bank.

Here is one design that I've been using for years. It's cheap to build, easy to assemble and can take the weight of all the boat anchors you can place on top.

It's an old idea, but with a modern touch. The table begins with an interior flush door. The original design called for the door to sit on top of two file cabinets. The trouble with this idea is that most two-drawer file cabinets are too short to allow for a comfortable operating height. Also, file cabinets are too small to provide a safe platform for the door. Finally, you can't get to the top drawer of either file cabinet because of the door on top. Even two cheap file cabinets will set you back about $50 each, so you're in the hole for $100 right off the start.

This design uses the basic idea of the flush door for the table top, but a different type of support. The supports are easily constructed out of 2 x 4s and some pine shelving.

Materials

Before you start up the saws, get a flush interior door. Many of the home centers sell these at a deeply discounted price. Ask if they have any damaged doors—you'll need only one good side because the other won't be seen. You have a choice of either a solid- or hollow-core door. The solid-core door will cost more money, but it's worth the price in the long run, so go the extra bucks. Flush doors also come in a variety of widths. The one I like the best is the 30"-wide door. You can get up to 36" wide, perhaps wider if you want to spend the extra bucks. A 24" wide door is just too narrow, except when you have little space to set up a bench. If the door had the hole cut for the door latch, so much the better. The hole makes a great place to pass cables from the top to the bottom shelf.

You'll also need several 6" 2 x 4s and some 1" x 4" pine shelving.

Get straight lumber with a minimum of knots in it. Also, pick up some 1-1/2" panhead screws, wood glue, and a tube or two of panel glue.

Construction Details

Cut three 2 x 4s to a length of 28". This and the thickness of the door (about 1-3/4") will give a table height of 29-3/4". Adjust the length of the 2 x 4s depending on the final height you require.

You'll need to cut both ends of the 2 x 4s as square as possible. The ideal tool to do this is a radial arm saw. Ask around if you don't have one in the basement. Some of the home centers will cut lumber, some will not. Almost all the lumberyards I've been in have a carpenter's shop. They'll cut the lumber to your exact needs, but for a price. Nothing is cheap in a lumberyard.

Cut six (three are needed for each leg) 2 x 4s to a length of 28". Next, you'll need eight 1 x 4 pine boards cut to a length of 24". On these pine boards cut the ends at a 45 degree angle. This makes for nicer-looking ends. See the drawing for details. These will become our legs to hold up the door. Make two, one for each end of the door.

Now take three 2 x 4s and two of the 1 x 4 pine boards and apply a liberal amount of glue to both sides of the wood. Place one 2 x 4 on each end and one in the middle. Using the panhead screws and an electric screwdriver, screw the pine boards to the 2 x 4s: *Be sure the 2 x 4s are full-seated flush with the edges of the 1 x 4s.*

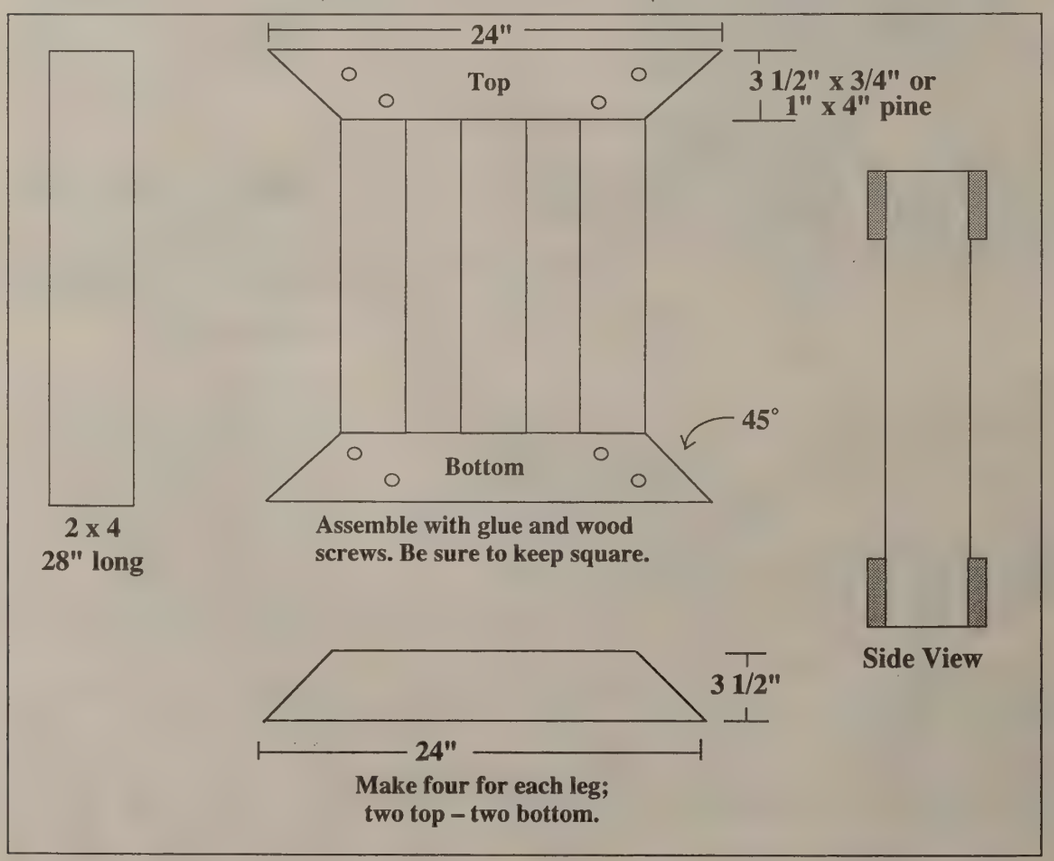


Figure 1. Worktable dimensions.

Photo A. One completed leg of the table.

Continue the assembly with the top of the leg assembly. Repeat the same procedure on the top as you did on the bottom of each leg. Be sure to keep the assembly square!

After you have both leg assemblies put together, lay them aside for now. Pick out the best side of the door and mark it as the top. Flip the door over and, using pencil and square, measure out 1" from the back. Next, measure in 4-1/2" from both ends. This will place the legs just under the table (door) and thus will give the look of a recessed table. There is nothing magical about these numbers, and you can change them to suit your own needs, but start out with these dimensions.

Screw a scrap piece strip of wood (a length of furring strip works well here) 10" from the top of each leg assembly. The strip of wood should be long enough to cover the last 2 x 4s on each assembly. With the help of an assistant, screw (but do not glue!) a 1" x 8" x 70" pine board to connect both the leg assemblies together.

You'll need a helper again for the following steps. With both leg assemblies connected together with the 1" x 8" x 70" pine board, spread a liberal amount of paneling glue to the top of both leg assemblies. With your helper, pick up the door and place it on the legs. Use the marks you made earlier as a guide and move the legs and/or the top to match up the marks. After you're sure everything is aligned, place some weights on top (a DX100 will do) and leave the table for 24 hours until the glue sets up.

After the glue has dried, install a backing board (another 1" x 8" x 73" pine board) to stiffen the leg assembly. Again, use panhead screws, not glue, to secure the backing board. You'll notice the two boards form a shelf to store power supplies, log books, or other accessories.

That finishes up the project. Use a good grade of wood stain and polyurethane varnish to give the table a lasting and durable finish. RF

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Forget Ohm's Law

Be creative instead.

by David E. Stanfield

Pushing electrons is a lot of fun, but it tends to keep you thinking. While this isn't harmful, it can lead to monodetached personality or tired brain. In other words, even the most dedicated experimenter needs time off. But, since he retired to his workbench in order to get away from his normal cares and troubles, it would seem that he must either stay in the frying pan or jump back into the fire.

If you think the experimenter has a problem, consider the electronic weirdo. You know him. He's the guy who's always building some marvelous mystifier, guaranteed to impress one and all. He has a house full of electronically guided frogs, automated picture straighteners, and an alarm system that uses delayed subatomic particle identifiers.

Photo A. Take my word for it, this is a horse. His ears are LEDs, and, to tell the truth, I haven't the faintest idea what the series resistance of his tail might be.

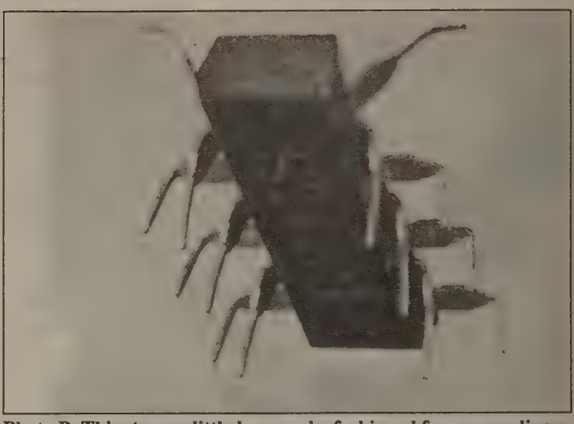


Photo B. This strange little bug can be fashioned from an ordinary 14-pin integrated circuit in a matter of minutes. Though small in size, it can stir up a large reaction when left on some unsuspecting person's desk.

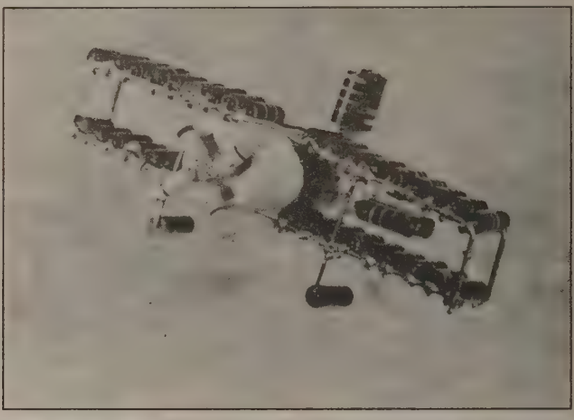


Photo C. This little seaplane has been flying for three weeks on one charge of its capacitor. As soon as it comes down, I'm going to charge it with AC.

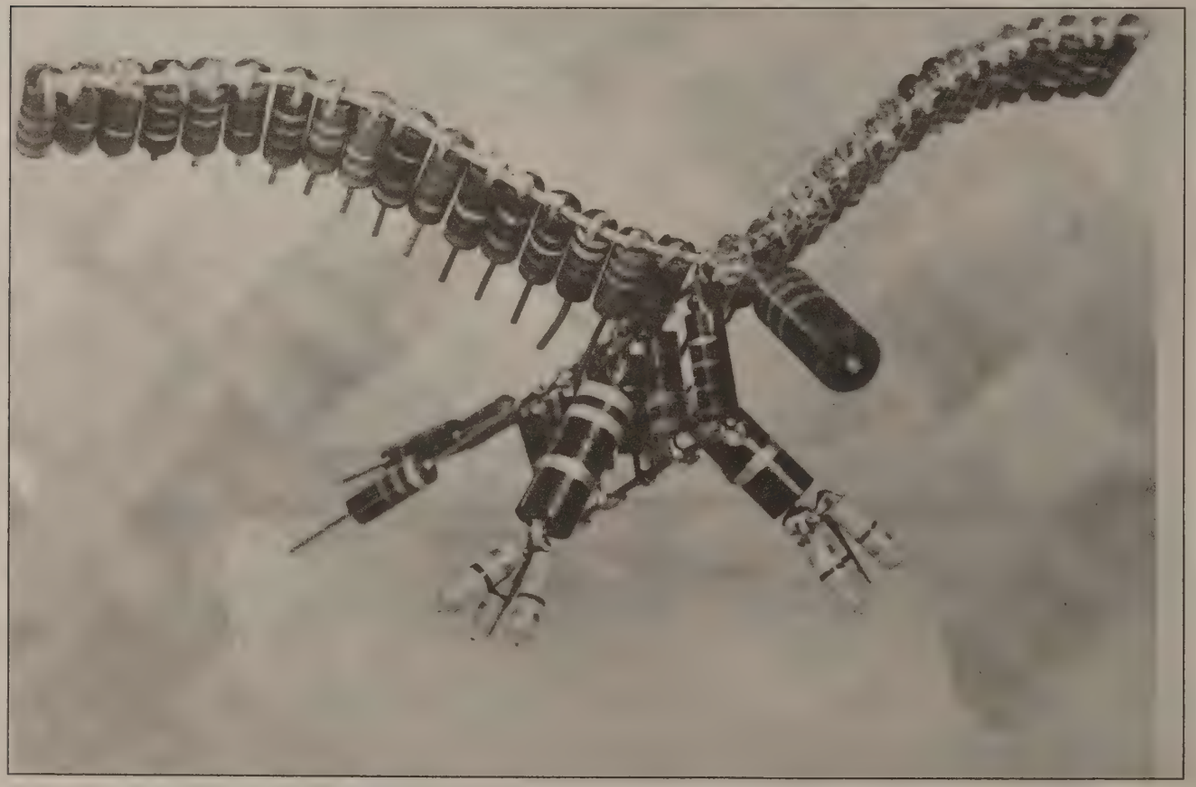


Photo D. Somehow a project that started out to be a chicken ended up as an eagle.

His problem is diminishing returns. When he started his career, he could get unlimited amounts of attention with a few blinking lights. But people have gotten used to his act, and now it takes an armful of sophisticated odds and ends to produce anything that merits more than a casual, "That's nice." Ever increasing amounts of time and money are required to produce these gadgets, while the interest they generate steadily becomes less and less.

Finally, we come to the larger group of less fanatic, but quite active, electronics students, technicians, and hobbyists. They try to keep current by reading a couple of magazines a month. When they see a project that interests them, they may hesitate to give it a try, unless it's something they can whip together in an evening or two for about three dollars.

Since I'm a combination of all the types listed above, I feel that my method of dealing with these prob-

Photo E. This fencer gave me a lot of trouble. Every time I tried to solder on another part, his sword would jab my finger.

lems can be used by almost anyone interested in electronics. As the accompanying photos show, I sometimes fashion small figures out of resistors, capacitors, and other components that catch my eye. While I make no claims to artistic success, I don't feel compelled to hide my efforts in a cellar.

I won't promise you fame and fortune if you try making some of these figures, but I honestly feel that the time you invest will be of benefit to you. We all receive a sense of satisfaction whenever we successfully complete a project, and, in comparison to most electronics projects, these figures are a snap. They can usually be completed in a couple of hours, so you're not going to be tied down for an extended period of time.

Since even those who have never even heard of electronics can appreciate these figures, they can be used as gifts, sold as art, or serve as conversation pieces.

I won't give explicit instructions for making these figures, but I will

Continued on page 24

what next?

by Carole Perry WB2MGP

A Child Leads the Way

As I travel across the country and attend numerous conventions and hamfests, I'm always delighted to meet with many ham families. In the large majority of cases, it is dad, or sometimes mom, who is the licensed ham first, and has succeeded in coaxing, bribing, convincing or cajoling the youngsters to become hams as well. In a few cases it is the child of the family who leads the way with his or her own enthusiasm for the hobby, for the rest of the group to follow. One such case is that of the Schuff family.

At age 7, Reuben was the key, according to his mom, to getting the Schuff family involved in ham radio. Sheryl KB9EGH first heard about amateur radio when she was a high school senior in the mid-'60s. Two classmates were hams and told her how they spoke with people all over the world and received cards from them. Sheryl didn't think about ham radio until years later.

In August 1988, Sheryl, her husband, Stephen, and their 7-year-old son Reuben visited the Children's Museum in Indianapolis when a Special Events Station was operating. Reuben was the first child waiting in line when the control operator called "CQ." He put Reuben at the mike to talk with a ham in the country of Montserrat. As we all know, sometimes that's all it takes to get someone "hooked."

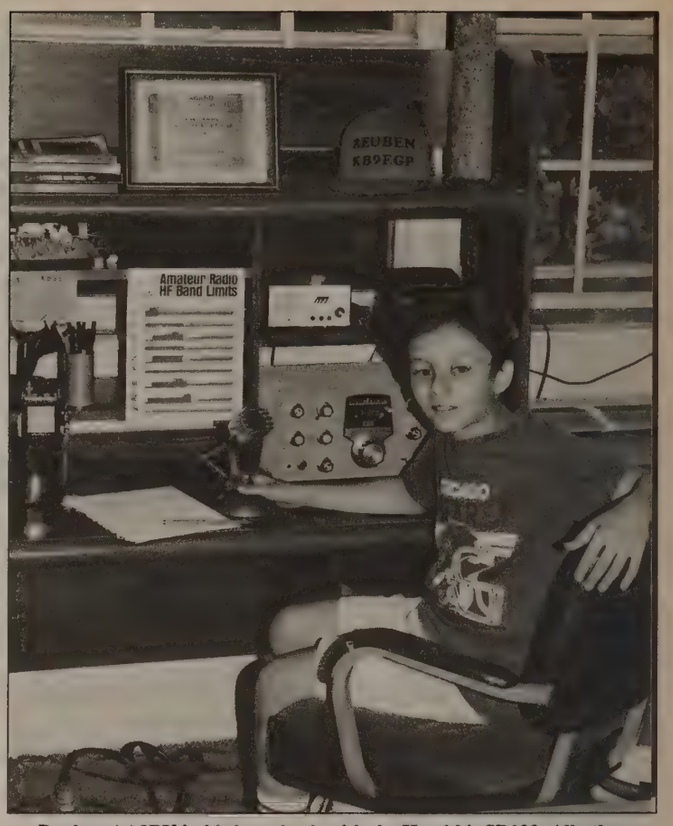
At various times over the next year, Reuben would look through a ham radio book mom had bought, and began to teach himself Morse code. In December 1989 he got a crystal radio kit and an AM/shortwave receiver kit which he built for projects in his Bear Den in Cub Scouts. Seeing how much he enjoyed this, and remembering his amazement at his QSO with Montserrat, mom encouraged him to pursue getting a ham radio license. Mike Galloway WD9AVQ, then president of the Indianapolis Radio Club, invited mother and son to his shack and showed Reuben how to tune up the Collins rig, how to calibrate the marker generator, and how to patch the audio to the telephone.

Reuben and Sheryl didn't waste any time enrolling in a Novice class. Reuben made sure that they both practiced code religiously—twice a day for 20-minute periods, every day. Reuben provided all the encouragement to mom, who claims not to have been so good with the 43 required characters for the test/In February 1990, when Reuben was 8 years old, they both passed their Novice exams. He soon convinced mom of the importance of upgrading. In April of that year they both passed Element 3A and upgraded to Technician.

As usually happens, the other family members couldn't help but notice that some members were having fun with an activity. The next to catch the "bug" were dad Stephen and sister Emilie. Mom was ready to stay put at this time, but Reuben wouldn't hear of it. He helped Sheryl get her code speed up to 13 wpm and went over all the General license material with her, encouraging her and suggesting ways to remember the answers. Whoever said that the child can't be the teacher? Surely, no one who knows what a bright, motivated youngster can do.

In February 1991 Reuben and Sheryl passed General theory and dad passed Elements 2 and 3A to become one of the first group of no-code Techs in Indianapolis. Emilie learned the code and passed her Novice test in March at age 11. At this point, young Reuben announced that he was going to make Extra before his 10th birthday. He was impressed with the young hams he had read about who were Extras, and he had met Sammy Garrett AA0CR, the 1991 Westlink Young Ham of the Year, who was a real inspiration to him.

At this point Sheryl and her husband realized how tough it must have been for someone Reuben's age to set such high goals for himself and to keep after his parents to keep practicing Morse code without coming across like a nag. Reuben pulled it off, though. In July, he and mom upgraded to Advanced and dad made Technician Plus. With true ham determination, Reuben kept studyingand passed Element 4B on August 17, 1991, qualifying for his Extra class license three weeks before his 10th birthday.



Reuben AA9BY in his hamshack with the Heathkit SB102. All other station equipment and accessories were donated or loaned by WE7A, WB9DKL, N9INN, WD9AVQ, KB9CMW, W9PEV, N9GON, and W9KGE. Photo by Paul Rice KB9CMW.

Mainly because of Reuben's curiosity and persistence, the Schuffs have spent the past two years trying out many different ham activities. They've worked on the low bands and have spent time on several repeaters; they've investigated ATV and slow-scan operations; they've participated in public service events for multiple sclerosis and the Indiana Special Olympics; they check in regularly to their county ARES net and took Skywarn weather spotter training; they've been to Field Day and to Boy Scout Jamboree on the Air; they've participated in the North American Sweepstakes, and have become active in three local radio clubs. Recently, Emilie has joined the pool of stations acting as net control for the ARES net.

Sheryl says proudly that the family has benefited a lot from amateur radio. They've met lots of people, made many new friends, and learned a great deal. She feels her family is stronger now because of the experiences they've been able to share and the ways they've been able to help each other. All the Schuffs agree that Reuben's interest, dedication, and encouragement have been an inspiration to them all.

Look for Reuben and his wonderful family at the Youth Forum in Dayton this April. Reuben's new call is AA9BY. RF

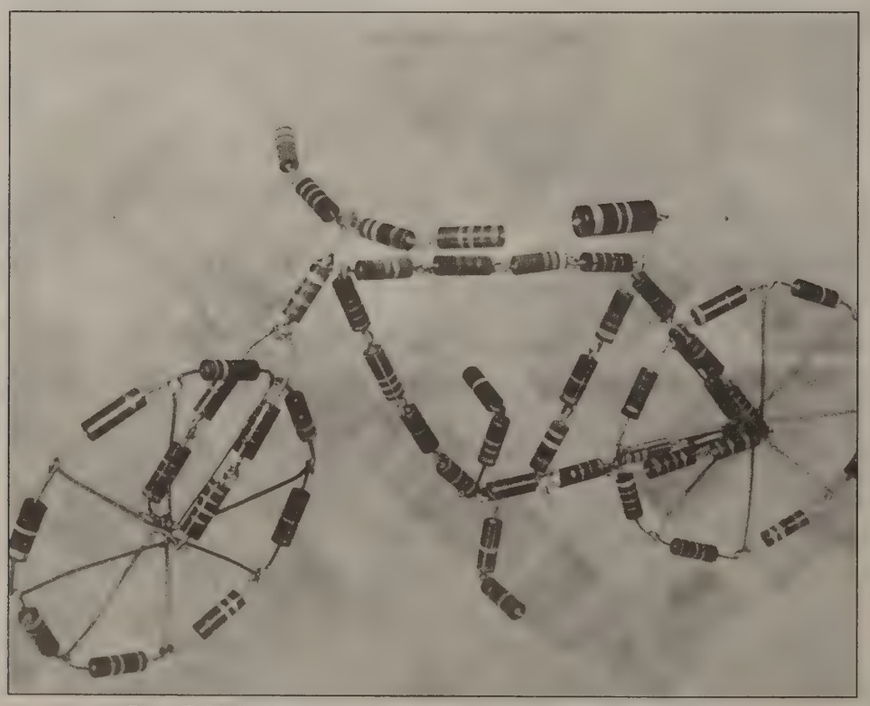


Photo F. While the tires on this bicycle have never gone flat, they tend to give a rough ride. As soon as I work that out, I'll sell a million.

Forget Ohm's Law

(Continued from page 23)

offer a few suggestions. To start with, I only use genuine electronics parts. This means no beer cans, bottle tops, or wood screws. If you don't like this rule, break it.

As a matter of personal taste, I always try to produce a figure most people can identify. I stay away from things like *Serenity of the Spirit, Part Four* or *Oneness with the Wholeness of Oz*. If you feel the urge to create these things, I wish you unification of the natural order.

In all cases, I use solder to join the various pieces together. I have used strips of masking tape and sheets of cardboard to hold pieces in alignment until I could get them soldered. At other times, my fingers served the same function. I've never used any of the miracle glues to tack components together, but my feelings won't be hurt if you do.

I know that resistors and capacitors can cost a bundle if they are purchased one at a time. Therefore, I recommend that you shop around for packages of mixed parts. Bags of 200 resistors for $1.98, or 98 capacitors for $3.00, are widely available. A few of these assortments will provide enough parts to make many figures.

I've intentionally made these suggestions pretty vague, as I feel too many rules would be restrictive. If you need rules and procedures, make them up. Try to keep in mind that the point of doing these figures is to enjoy yourself and perhaps share that enjoyment with others. If you want to copy or modify any of the figures shown in the photos, do so. I hope that you will then want to do some of your own design. RF

Reprinted from the January 1978 issue of 73 Amateur Radio. *Contact David E. Stanfield at 3408 Catalina Drive, Atlanta GA 30341.*

Resonant vs. Non-Resonant Dipoles

Dipoles and multi-band Zepps

by Bob Benson W2HZF

Many old-time hams have gone full circle and returned to the center-fed random-length dipole, often referred to as the double Zepp antenna. For the newcomer, this antenna has a lot of merit and bears serious consideration. It is just as cheap to build as the coaxial-cable-fed single-band dipole and it offers all-band operation and better antenna system efficiency.

Most hams introduced to the high frequency (HF) amateur bands have purchased a multiband transceiver, which often includes general coverage receiving capability from about 150 kHz to 30 MHz. Why not get started with an antenna that will transmit efficiently on *all* those HF amateur bands, and also provide good shortwave listening between the bands? The center-fed Zepp design is such an antenna.

Let's compare the popular 50 ohm coaxial-fed half-wavelength dipole with the twin-lead-fed Zepp. We'll assume that you are using the typical solid-state transceiver with an untuned transistorized final amplifier. Let's also assume your dipole antenna is pruned to be resonant at the center of the 3.5 to 4.0 MHz band, 3.75 MHz.

The disadvantage of using a transceiver with an untunable output stage is that it will only be able to transfer maximum available power to the antenna if the antenna has a 50 ohm resistive input impedance. In our example, this condition will only be met at the resonant frequency—3.75 MHz. At all other frequencies in the band the antenna will be mismatched. The antenna will appear as a resistance and capacitive reactance combination ($R - j X_C$) between 3.75 and 4.0 MHz, and as a resistance and inductive reactance combination ($R + j X_L$) between 3.75 and 3.5 MHz. The reactive components get larger as the transceiver is tuned away from the center frequency toward the band edges.

The greater this mismatch, the more power is reflected back from the antenna toward the transceiver. If the transceiver is a solid-state one with an untunable final amplifier, the power reflected from the antenna is recognized by the transceiver circuitry for what it is—reflected power. The transceiver has no means of self-tuning or permitting the operator to retune to rereflect this power back to the antenna where it will contribute toward the radiated power. So . . . the transceiver "shuts down" to protect the final amplifier transistors from the high current that would result from the mismatched load. The reduction in power output generated by the amplifier is roughly equal to the reflected power that reaches the transceiver output terminals. Briefly, this is what is happening when we measure a high voltage standing wave ratio (VSWR) at the output terminals. The higher the VSWR, the lower the actual power output from the transceiver.

Our simple half-wave dipole example will have a VSWR of about 6:1 at the low edge of the band, and about 5:1 at the high edge of the band. The power lost in the coaxial cable transmission line at VSWRs as high as 3:1 and somewhat higher are usually negligible. The biggest loss is the shutdown power—the loss of available power from the transceiver.

Antenna Tuners

The above example points out the need for an antenna tuner. It could be a separate tuner connected anywhere in the transmission line, but preferably next to the transceiver for convenient adjustment. If you happen to have a transceiver sporting a built-in tuner, this tuner will probably meet all your requirements. You are also home free if you have one of the older tube type transceivers with a pi network or similar means of tuning the transceiver's final amplifier. In most cases these two examples have the reactance range to tune your off-resonant antenna system (antenna plus transmission line) and provide a proper match for the output of the transceiver.

At this point it looks as if our 3.75 MHz half-wave dipole system has, with the aid of a tuner, become efficient throughout the 75/80 meter band. It also seems to have the earmarks of an all-band antenna. Basically, it does have these, but let's see why we should consider the center-fed Zepp as a better alternative to the coax-fed dipole.

The physical difference between the center-fed Zepp and the half-wave dipole is the transmission line. The single frequency dipole uses a 50 to 75 ohm coaxial cable. This is because the half-wave dipole at its natural resonant frequency has an impedance in this range and provides a good match (at resonance) with the untuned transceiver. Coax, however, is less tolerant of high VSWRs, particularly when using an amplifier.

The physical difference between the center-fed Zepp and the half-wave dipole is the transmission line. The single frequency dipole uses a 50 to 75 ohm coaxial cable. This is because the half-wave dipole at its natural resonant frequency has an impedance in this range and provides a good match (at resonance) with the untuned transceiver. Coax, however, is less tolerant of high VSWRs, particularly when using an amplifier.

The Zepp was used as an all-frequency antenna back in the pre-coax era when hams made their own transmission lines and tuned their transmitters. The typical transmission line was made up of two #14 enameled copper wires, spaced about six inches apart with paraffin-soaked wooden dowels. These spacers were located every foot or so along the line. This arrangement had a transmission line impedance of about 600 ohms, but the exact impedance wasn't important. This type of line also permitted the normally very high VSWRs to occur with practically no loss, even when running high power.

The center-fed Zepp antenna may be constructed with three insulators and about 100 feet of copper wire. The transmission line should be good quality 300 ohms "twin-lead" or open wire line of any impedance from, say, 300 to 600 ohms. The transmission line length *is* critical—just long enough to reach from the center of the antenna to the terminals on your antenna tuner. Don't attempt to roll up extra length as is often done with coax. A good transmission line choice is the 450 ohms "ladder line." It is made of 18 AWG copperweld wire spaced 7/8-inch. The dielectric is flat polyethylene with randomly spaced windows so that much of the dielectric is actually air. The line has less loss than the common 300 ohm line, will handle larger VSWRs, and will certainly tolerate 1000 watts if you wish to use a power amplifier.

The length of the Zepp is not critical. The reason the length is not critical is because the antenna is resonated by the tuner. If the tuner has a reactance range capable of conjugate matching the reactance of the antenna and transmission line at the frequency of operation, then the antenna system can be resonated. All of the reflected power from the antenna is rereflected back to the antenna by the tuner except for the very small amount of power lost in the transmission line. Therefore, practically all of the available power output from the transceiver will be made available to the antenna. Although the antenna length is not critical, for best results, try to make the length at least three-eighths- to half-wavelength tip-to-tip on the lowest frequency you wish to operate (three-eighth-wavelength on 3.5 MHz is about 100 feet).

Depending upon the relationship of the length of this antenna to the operating frequency, it may answer to a number of different names. It might best be loosely referred to as a random-length dipole. If the antenna is made about 137 feet long (a half-wavelength on 3.5 MHz), it might be called a center-fed or double Zepp on that band, a collinear dipole on 40 meters, and a center-fed longwire antenna on the higher frequencies. At the lowest design frequency, the radiation pattern will conform fairly close to that of the coax-fed resonant dipole. At higher frequencies more lobes occur that tend to shift the gain toward the ends of the antenna instead of broadside.

. So there you have it—an efficient multiband antenna with a very flexible length requirement. Disadvantages? Not many. It does require an antenna tuner, which you probably should be using anyway. It also requires just a little more ingenuity to route the twin lead into the shack and space it from that tangle of power cables and coax behind the ham equipment. RF

Contact Bob Benson W2HZF at P.O. Box 1154, Sequim WA 98382.

activities calendar

Send your announcements to: Radio Fun Activities Calender, 70 Route 202-N, Peterborough NH 03458.
We'll print as many as space allows, on a "first come - first listed" basis.

MAY 2

GRAND JUNCTION, CO The Western Colorado ARC will hold its annual Hamfest in Liff Auditorium at Mesa State College from 9 AM-2 PM. Seminars. VE Exams. Talk-in on 146.94. Call Ernie NOEQ, (303) 242-6035, or Bob N0OKL, (303) 434-8604.

EAST LIVERPOOL, OH The Triangle ARC will hold its first annual Hamfest at the Calcutta Fire Hall. Talk-in on 146.10/.70 rptr. Contact Dick Sisley K8JKB, Secretary, 1218 Northside Ave., East Liverpool OH 43920.

SONOMA, CA The Valley of the Moon ARC, WB6DWY will hold its semi-annual "ham" and egg breakfast, VE exam, swapmeet, ARRL Hamfest, ATV, packet radio demonstration starting at 8:00 AM at the Sonoma Community Center, 276 East Napa St. Fishing in afternoon. VE exams will be walk-in, with registration at 10:00 AM. Testing at 11:00 AM. Swap spaces $10. Breakfast $5. Admission free. Talk-in on 147.47 simplex and 144.75/145.35 rptr. Contact Darrell WD6BOR at (707) 996-4494.

MAY 2-3

ABILENE, TX The Key City ARC will sponsor the ARRL West Texas Section Convention and Hamfest at the Abilene Civic Center from 8 AM-5 PM Sat., and from 9 AM-3 PM Sun. Free parking. VE Exams. Wheelchair access. Tables $5 each. Pre-registration $6 (must be received by Apr. 28), $7 at the door. Talk-in on 146.16/.76. Contact Peg Richard KA4UPA, 1442 Lakeside Dr., Abilene TX 79602. (915) 672-8889.

SIERRA VISTA, AZ The Cochise ARA will hold its annual Hamfest at the Club training facility. Drive 5 miles east of town on State RT. 90, and then 2 miles south on Moson Rd. VE exams. Overnight RV camping (no hookups) available to club members. Talk-in on 146.52 or 146.76(-0.6). Handicapped facilities. Contact N7INK (602) 378-3155 after 6 PM or write to CARA, PO Box 1855, Sierra Vista AZ 85636.

MAY 3

ST. PETERSBURG, FL The St. Petersburg ARC will sponsor a Hamfest at Lake Maggiore Park (9th St. & 38th Ave. So.) from 8 AM-1 PM. Flea Market. Tailgating. Free Admission. Bring a picnic lunch and eat under the park shelters. Talk-in on 147.06 rptr. Lake Maggiore Park is a city park, so there will be no commercial dealers. Contact Robert Russell N4ZMQ, (813) 896-2518.

NEW CASTLE, DE The Penn-Del ARC will sponsor the Penn-Del Hamfest at the Nur Temple, 198 S. DuPont Hwy., (RT 13 near US 40 split), from 8:30 AM-2 PM, rain or shine. Set-up at 7 AM. Indoor/outdoor reserved swap tables, tailgating, VE Exams, Commercial exhibitors. Indoor tables with electricity, $10; without electricity, $8. Outdoor tables are $6. Tailgating $5. General admission $4. Reservations required for swap tables: send check to PO Box 1964, Boothwyn PA 19061. Make checks payable to PENN-DEL ARC. For info call (215) 497-2124.

MAY 9

MANITOWOC, WI The Mancorad RC will sponsor a Ham/Computer/Flea Market at the Manitowoc County Expo Ctr., intersection of Hwys 42-151 and I-43 on Co. R. from 8 AM-3:30 PM. Set-up at 7 AM. VE Exams, all classes. Camping available via Manitowoc Co. Expo Ctr., (414) 683-4378. Advance tickets $2, $3 at the door. 8lfootl tables $5 with outlet, $3 without. Talk-in on 146.01/.61. Contact: via SASE to Mancorad R.C., Box 204, Manitowoc WI 54221-0204 or call (days) "John" (414) 682-9151; (nights) "Lou" (414) 682-2557.

MAY 10

ATHENS, OH The Athens County ARA will hold its 13th annual Hamfest from 8 AM-3 PM at the City Recreation Center. Take the East St. exit on either US Route 33 or US Route 50, and look for signs to the Hamfest. Admission is $4 a person, but in honor of Mother's Day, YLs and spouses of male hams will be allowed in free. Free paved outdoor flea market space adjacent to building for tailgaters and those bringing their own tables the day of the event. Indoor space available by advance registration only. To register, contact John Biddle WD8JLM, 80 Wonder Hills Dr., Athens OH 45701. (614) 594-8901 (after 6 PM). Talk-in on the Club rptr. at 145.15+ MHz. For info write to Carl J. Denbow KA8JXG, 63 Morris Ave., Athens OH 45701-1939.

WHEATON, IL GMRS of Illinois, Inc., will hold their Bi-annual Fest from 8 AM-1 PM at the DuPage County Fairgrounds, Manchester Rd. Set-up will begin at 6 AM. Advance tickets $4; $5 at the door. Tables $10 each. Free outdoor Flea Market spaces. Ladies admitted free. For info call Bob, (708) 690-1492.

MAY 15-17

VENTURA, CA The 1992 West Coast VHF/UHF Conference, sponsored by the Ventura County ARC, will be held at the Holiday Inn on the Beach, 450 East Harbor Blvd. Free parking. Take advantage of the special hotel Conference Rate of only $55 per night, double occupancy (plus room tax). Be sure to mention the conference. Offer valid until May 1. Hotel reservations: 1-800-842-0800. Sat. night Banquet $25 (pre-register only). Sun. morning Breakfast, $10. No-Code Tech class and Exams, call (714) 979-2633. There will be a list of proceedings available at the Conference for $10. Make checks payable to Ventura County ARC and mail payment to VCARC, PO Box 2103, Oxnard CA 93033. For info call (805) 647-4294. No refunds after May 6. For exhibit space call (805) 264-1978.

MAY 16

COLORADO SPRINGS, CO Pikes Peak RAA will host the largest Ham-Computer Swap in Colorado from 8 AM-4 PM. Admission $3. Tables $10. Contact Al N0CMW or Frances N0IUT, (719) 473-1660. Write: PPRAA, PO Box 16521, Colorado Springs CO 80935. VE Exams. Free Parking. Take Filmore Exit East off I-25 to Union, then right to Mega-Mart, 1801 Union Blvd. Talk-in on 146.37/.97 or 146.52.

EPHRATA, PA The Lancaster County Hamfest, sponsored by the Ephrata Area Repeater Society, Inc., will be held at the Ephrata Senior High School, 803 Oak Blvd., beginning at 8 AM. Set-up at 6:30 AM. All sites handicap accessible. VE Exams at 9 AM. Admission $4. Tailgating $3. Inside tables $6. Talk-in on 145.45 MHz, 146.52 MHz and 444.65 MHz. For info and reservations, call Tom Youngberg K3RZF, (215) 267-2514 after 6 PM; or write E.A.R.S., 906 Clearview Ave., Ephrata PA 17522.

CADILLAC, MI The Wexaukee ARA will hold their annual Swap and Shop at the Cadillac Middle School, 500 Chestnut St., from 8 AM-1 PM. Admission $3. Tables $6. Talk-in on 146.38/.98 rptr. Call Dan Schmidt KE8KU, (616) 775-0998; or write Wexaukee ARA, PO Box 163, Cadillac MI 49601-0163.

NO. SMITHFIELD, RI The Rhode Island Amateur FM Repeater Service, Inc., will hold their annual Spring Auction and Flea Market at the VFW Post 6342, Main St., beginning at 8 AM. Take the Forestdale exit off Route 146 in No. Smithfield, take a left at the end of the ramp and go six tenths of a mile to the Post (on your right just before the Village Haven Restaurant). Flea Market spaces $5 each. There will be an auction from 11 AM-3 PM. Donation $1. Talk-in on 146.76. For info contact Rick Fairweather K1KYI, 106 Chaplin St., Pawtucket RI 02861, or call (401) 725-7507 between 7 and 8 PM.

AMENIA, NY A Hamfest sponsored by the Southern Berkshire ARC, will be held at the Amenia NY Firehouse (US Rte 44 or NY 22 to Amenia stoplight, east on 343 one block to Mechanic St., to the firehouse. From Connecticut, west on Rte 4 to Sharon, then west on 343 to Amenia. Pavilion tables $4. Admission $3. Talk-in on 147.285/.885. SASE to Ed Wilbur WB1CEI, PO Box 547, Sharon CT 06069. (203) 364-5206 eves.

KLAMATH FALLS, OR The First Annual South Central Oregon Hamfest will be held at the Oregon Institute of Technology campus. Exhibitor booths, Flea Market tables, lasers, and license exams for all classes, are among the events planned. 10lfootl tables $10 each. Contact Hollis Kiger W7UFM, (503) 882-5129 or Dick Switzer KB7DWX, (503) 882-1300.

MARSHALLTOWN, IA The Central Iowa RAS will hold its Hamfest at the Marshalltown Community College-1/4 mile south of HWY 30 just east of HWY 14. Talk-in on 146.28/.88. VE exams, sign up at 10 AM-2 PM. For info call Chuck Dennis WB0ZKG, Toledo IA. (515) 484-4837. Tickets $3 in advance and $4 at the gate. Call or write Charles Lynk W0DYS, 2460 Reed Ave., Marshalltown IA 50158. (515) 753-6925 or Brian Krumm N0MXK, 911 South 8th Ave., Marshalltown IA 50158. (515) 752-9658. Tailgating.

MAY 16-17

HARTWELL, GA The Lake Hartwell Hamfest will be held at Hartwell Group Camp Sat. and Sun. ARRL sponsored VE Exams for all classes will be held on Sat. the 16th.

BIRMINGHAM, AL The BirmingHamfest will be held indoor at the Birmingham-Jefferson Civic Center. Talk-in on W4CUE/R, 146.880 MHz. Commercial exhibitors, Flea Market, Electronic equip., VE Exams (Sunday only). Adult admission $5. Write: BirmingHamfest '92, PO Box 94775, Birmingham, Al 35220 or call (205) 979-7039.

May 17

WHEELING, WV The Triple States RAC will sponsor the 1992 TSRAC Wheeling Hamfest/Computer Fair from 8 AM-3 PM at Wheeling Park.

CAMBRIDGE, MA The MIT Electronics Research Society, the MIT Radio Society, and the Harvard Wireless Club will co-sponsor a Tailgate Flea Market for electronics, computer and amateur radio, from 9 AM-2 PM (rain or shine) at Albany and Main St. Free off-street parking. Covered tailgate area for 400 sellers. $8 per space at the gate; $5 in advance (includes 1 admission). Set-up at 7 AM. For reservations or info call (617) 253-3776. Mail advance reservations before May 5th to W1GSL, PO Box 82 MIT BR., Cambridge MA 02139. Talk-in on 146.52 and 449.725/ 444.725-pl 2A, W1XM rptr.

SACRAMENTO, CA The North Hills RC will hold Hamfest '92, starting at 8 AM PST, at the Carmichael Elk's Lodge at Hackberry Lane and Cypress Ave. Talk-in will be on the K6IS rptrs., on 145.190 MHz and 224.400 MHz. Inside tables and outside spaces are available. There will be demonstrations of Oscar, Packet, and ATV. Admission $1. This is the BIG ONE in the Sacramento Valley Section.

May 17-19

PEOTONE, IL The Kankakee ARS will hold its annual Hamfest at the Will County Fairgrounds on May 19 from 8 AM-2 PM. Indoor exhibit area, ARRL booth, large outdoor flea market. Free Parking. Set-up May 17 from 6 AM-8 AM. Admission $3.50 in advance, $4.00 at the door. Take I-57 south of Chicago. Exit 327 east to Peotone. Fairgrounds one mile on left. Talk-in on 146.34/.94. More information from KARS C/O Frank DalCanton KA9PWW, 117 Kristina Dr., Bourbonnais, Il. 60914. (815) 932-5950 after 7 PM CST.

May 22-24

TULSA, OK The Green Country Hamfest will be held at the Maxwell Convention Center in down-town Tulsa, located on W. 7th St. between Denver and Houston Avenues. Large indoor flea market, new equipment dealers, forums, V.E. exams, alternate activities for non-amateurs. Admission $8 in advance, $10 at the door. Free parking. Flea market tables $6 in advance and $8 at the door. RV parking. Talk-in on 146.28/.88 Tulsa Rptr. Hamfest information (918) 272-3081. PO Box 470132 Tulsa, OK. 74147-0132.

May 23-24

YAKIMA, WA The Yakima ARC W7AQ will sponsor the Washington State Hamfest and the 1st Annual NW Packet Radio Conference. Seminars for all levels of packet radio. VE testing for all levels on Sat., May 23rd at 1:30 PM. Walk-ins will be accepted. New dealer displays as well as swap & shop tables. Early Bird Breakfast, Sat. and Sun. at 7:30 AM. Banquet Sat. eve. at 6:30 PM. Cost $10.50 per person. Talk-in on 146.06/.66. Take 16th Ave. exit off HWY 12, South on 16th to Chestnut Ave., East on Chestnut to 14th, South on 14th to Entrance of St. Paul's School Gym. Admission $5 in advance, $6 at the door. Contact Dick Umberger N7HHU, W7AQ Yakima ARC, PO Box 9211, Yakima, WA 98909, (509) 453-8632 days.

May 24

YOUNGSTOWN, OH The Twenty Over Nine Radio Club is sponsoring a Hamfest at the Canfield Fairgrounds from 8 AM-3 PM. Tickets are $3 in advance and $4 at the door. Indoor tables are $8. Flea market $1. Security provided. Free parking. Talk-in on 147.315. For directions 145.275. Contact Twenty Nine Radio Club, 42 South Whitney, Youngstown OH 44509.

May 31

MILFORD, CT For the 1992 Coastline ARA All Class Exam Schedule, contact: Gary NB1M, (203) 933-5125 or Dick WA1YQE, (203) 874-1014. Place: Fowler Bldg., 145 Bridgeport Ave., Milford CT. Time: 12 Noon. Walk-Ins.

SPECIAL EVENT STATIONS

May 1-2

BAKER, CA The Ancient and Honorable Order Of E Clampus Vitus, Billy Holcomb Chapter ARC, will operate Station KC6LUC from 1700Z-0400Z to commemorate "The Historical Chicago to Los Angeles Route 66". Operations will be in the General 40, 20, 15 and the Novice portion of 10 meters. For a Certificate, send QSL and SASE to ECV ARC, 1458 Albright Ave., Upland CA 91786.

May 2-3

MEMPHIS, TN The Mid-South ARA will operate W4EM 1300Z May 2-0500Z May 3 to celebrate Memphis in May International Festival. This year's honored country is Italy. Operation will be in the lower 50 kHz of the SSB General 80-through 12-meter and the Novice 10k-meter subbands. For certificate, send QSL and a 9 x 12 inch SASE to Mara W4EM, 2966 Cordell, Memphis TN 38118.

May 6-7

SIOUX CITY, IA The Siouxland ARA will operate K0AAR from 1500z-2100z to celebrate the 120th anniversary of the 1500 mile steamboat river race between The Nelle Peck and The Far West. Phone-7.243, 14.255, 21.355, 28.355. For certificate send SASE to K0AAR, 3407 Jennings St., Sioux City IA 51104.

May 8

FRANKLIN, MA Tri County Amateur Radio will operate WW1H 1400Z-2100Z to Commemorate the 15th Anniversary of Tri County Regional Vocational Technical High School. Operations will be in the lower end of the 10 meter Novice phone band and the 20 meter General phone band. For certificates, send QSL and a SASE to WW1H Tri County Amateur Radio, 147 Pond Street, Franklin MA 02038.

May 8-9

FORT PIERCE, FL The Fort Pierce ARC will operate KN4RY; 1600Z-2300Z May 8 and 1400Z-2100z May 9 to commemorate the 5th Annual Trail Ride of the Florida Cracker Trail Assn. Operation will be in the 40, 20, 15, and the Novice portion of the 10 meter phone band. For Certificates, please send a QSL and large 9 x 12 SASE (2 Units of Postage) to W3DHN, 18 Cordillera, Fort Pierce FL 34951.

May 9-10

LAS VEGAS, NV The Nevada QSP Party sponsored by the Frontier ARS will be held from 0000Z May 9 to 0600Z May 10. Work stations once per band per mode. Exchange RS(T), and State/Province/Country (Nevada Stations also give county). Frequencies: 6 through 160 meters; modes-CW/SSB/RTTY/SSTV/PACKET. Scoring-1 Pt. Phone QSO, 2 Pt. other modes. Non-Nevada Stations multiply by number of Nevada Counties, Nevada Stations multiply by State/Province/Country Total. Awards-Certificates to top score each State/Province/DXCC Country, General and above, Novice & Tech. Mail Entry By June 1, 1992 to: Jim Frye NW7O, 4120 Oakhill Ave., Las Vegas, NV 89121.

GRAYS HARBOR, WA The Grays Harbor ARC will be conducting a special events station commemorating the 200th anniversary of the discovery of Grays Harbor. On May 7th, 1792 Captain Robert Gray, in his ship Columbia, sailed into the harbor. Look for W7ZA from 0000Z, May 9th to 2400Z May 10th on the bottom part of the General phone band on 15 thru 80 meters, on Novice phone portion of 10 meters and 40 up from the bottom of the CW bands on 10 thru 80. For a special QSL card please send your QSL card and a SASE (Legal Size) to: ARS: KA7AIR Joe Ledesma, 516 6th Street, Hoquiam, WA 98550.

MOUNT VERNON, VA Members of the Mount Vernon ARC will operate 1400-2100Z from locations on the original Mount Vernon estate of George Washington, to celebrate the 250th anniversary of the founding of Fairfax County, VA. CW-7.130, 14.040, 21.110; phone-7.227, 14.250, 21.325, 28.325; VHF voice 146.655; and VHF and HF packet on 145.670 (DCA and WASHDC nodes). For certificate, send QSL and a 9 x 12 inch or #10 SASE to Steve Schneider WB4EEA, 8602 Cushman Place, Alexandria VA 22308. DX stations send 2 IRCs with QSL and self-addressed envelope. QSL card confirmation will be sent in addition to certificate only if specifically requested.

WALL TOWNSHIP, NJ The Ocean-Monmouth ARC will be sponsoring the Commemoration of Marconi's Memorial Tower Radio Site, Circa 1914. OMARD will operate KC2Q from 1600Z on May 9 to 1900Z on May 10. Phone at the low end of the General portion of the 15 through 75 meter band, Novice portion of 10 meter band. CW will be on 3545, 7045, 14045, 21045 MHz. For flat certificate, send 1 green stamp, or SASE for folded, to OMARC, PO Box 75, Bradley Beach NJ 07720. Visitors welcome. Talk-in 145.110 -600.

May 10

PROMONTORY, UT The Ogden ARC will operate KE7QV from Promontory Summit, UT to commemorate the driving of the Golden Spike. operations will be from 0001-2100Z on one of the following: 3.970, 7.270, 14.280, 21.375, and 28.415 MHz. Send QSL and SASE to Ogden ARC, PO Box 3353, Ogden UT 84409.

May 13

TOWNSVILLE, AUSTRALIA The National commemoration of the 50th Anniversary of the Battle of the Coral Sea. During May 1-13, a special event callsign, VI4BCS (Victor India Four Battle Coral Sea), will be activated from the Club's premises at Green St., West End, Townsville. A special QSL card will be available for all QSO's to VI4BCS. Celebrations include a troop train from Brisbane, bringing 300 ex-servicemen and women to Townsville; the arrival of four US Navy ships, and three Australian Navy Ships, on May 8, to unveil the $100,000 Coral Sea Memorial in Anzac Park. Please phone Bob Mann VK4WJ on (077) 797869 or Roger Cordukes VK4CD on (077) 740221 or write to TARC Inc, P.O. Box 964, Townsville, 4810 Australia. Packet Address: VK4WIT @ VK4AFS .NQ. QLD. AUS. OC.

May 14-15

FORT MCCLELLAN, AL 1992 marks the Golden Anniversary of The WAC and the WAAC. The reunion will be held at the historical home of the Women's Army Corps. This year's celebration honors Maj. Gen. Mary E. Clarke. Two-way radio communications on MARS and Amateur Radio frequencies. Certificates will be awarded to all WAC's and WAAC's who participate in the reunion on the air. A QSL card will be sent for the radio operators who assisted them. The station will operate on 28.350, 21.350, 14.285, 7.272, and 3.900 MHz using the callsign N4MOK. Contact the WAC Foundation at (205) 848-3512 or the Fort McClellan Army MARS station at (205) 848-4818.

Continued on page 7.

updates . . . updates . . . updates . . .

Changes, corrections and reader suggestions for previously published articles

CMOS IC Keyer

1/92 issue – page 6

A modification to improve the code speed adjustment can be made by installing a 47k resistor in series with the 1 MEG potentiometer and increasing the value of capacitor C1 to 0.33 uF by placing two 0.1 uF capacitors in parallel with the existing capacitor (see Figure 1).

You can also make the keyer into a "squeeze" style action, by adding a switch in series with diode D1 to remove it from the circuit when desired as shown in Figure 2. *TNX to the author, Gerald F. Gronson K8MKB, for these modifications.*

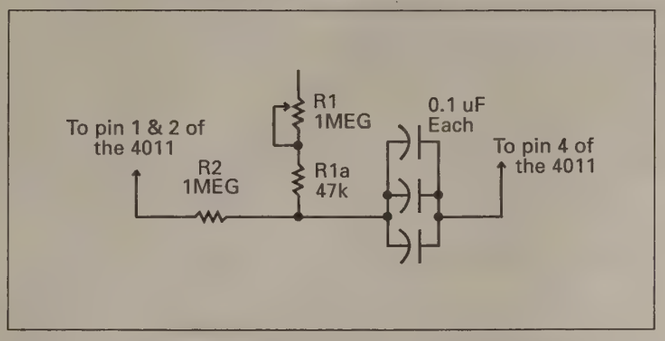


Figure 1. Modifications for improved code speed adjustment for the CMOS IC Keyer. One side of new resistor R1A can be soldered directly to the potentiometer and the other end of the resistor can be attached to the wire.

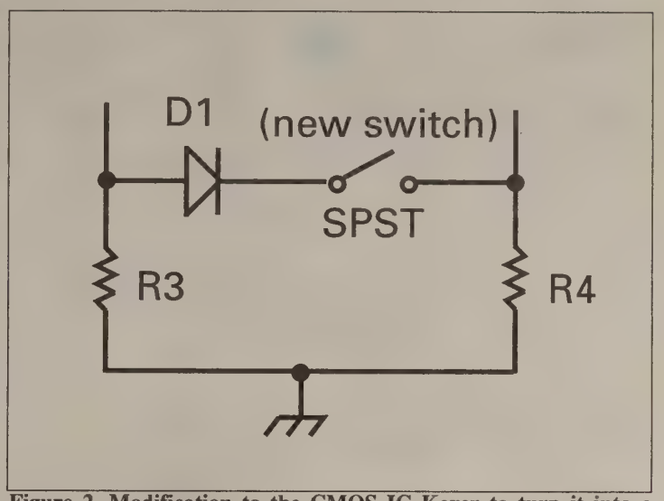


Figure 2. Modification to the CMOS IC Keyer to turn it into a "squeeze" style keyer.

Radio Fun flea market

Turn your old ham and computer gear into cash now. Sure, you can wait for a hamfest to try and dump it, but you know you'll get a far more realistic price if you have it out where 30,000 active ham potential buyers can see it, rather than the few hundred local hams who come by a flea market table. Check your attic, garage, cellar, and closet shelves and get cash for your ham and computer gear before it's too old to sell. You know you're not going to use it again, so why leave it for your widow to throw out? That stuff isn't getting any younger!

The *Radio Fun Flea Market* costs you peanuts (almost)—comes to 10 cents a word for individual (noncommercial) ads, and 70 cents a word for commercial ads. Don't plan on telling a long story. Use abbreviations, cram it in. But be honest. There are plenty of hams who love to fix things, so if it doesn't work, say so.

Make your list, count the words, including your call, address and phone number. Include a check or your credit card number and expiration. If you're placing a commercial ad, include an additional phone number, separate from your ad. This is a monthly magazine, not a daily newspaper, so figure a couple of months before the action starts; then be prepared. If you get too many calls, you priced it too low. If you don't get many calls, too high.

So get busy. Blow the dust off, check everything out, make sure it still works right, and maybe you can help make a newcomer or retired old-timer happy with that rig you're not using.

Send your ads and payment to *Radio Fun Flea Market*, Sue Colbert, 70 Route 202 N, Peterborough NH 03458, and *get set for the phone calls.*

NEXTDAY QSLs - Order 1-800-926-7373. We ship next day. Sample, $1. AntennasWest, Box 50062F, Provo UT 84605-0062. RF199

MORSE CODE MUSIC? Yes it's true! Now the Morse Code alphabet can be learned and enjoyed while doing aerobics, jogging, driving, or dancing. Order **"RHYTHM OF THE CODE"** cassett single hit today! Send $5.95 (plus $2 S+H) to Kawa Productions, P.O. Box 319-R, Weymouth MA 02188. For information send SASE. RF247

MINIATURE POLICE RADAR TRANSMITTER one mile range, $41 assembled, $31 kit, (219) 489-1711. P.O. Box 80096, Fort Wayne IN 46898. RF251

STORM WARNING EQUIPMENT P.O. Box 17721, Huntsville AL 35810. Tel. (205) 859-8729. RF252

IN NEED OF ANY AMATEUR RADIO EQUIPMENT for the disabled and handicapped. Please send inquiries or call: Julian Flores KD6CFK, 505-836-0691. 1917 Sunset Gardens SW, Albuquerque NM 87105. RF257

POWER SUPPLY LAB TYPE with meter. 1.2 to 15V. Buy parts from RADIO SHACK, less than $30. Complete construction INFOPACK. Send $3.00 to LYNN JOHNSON ELECTRONICS, P.O. Box 51268, San Jose CA. 95151-1268. RF262

FREE PLANE ANTENNA can be cut from 140Mhz to 1300Mhz. Complete construction INFOPACK. Send $3.00 to LYNN JOHNSON ELECTRONICS, Box 51268, San Jose CA 95151-1268. RF268

ONLY NINE Radio Shack parts builds a 30/40 meter QRP transmitter!! Complete plans-only $5. DWM ENTERPRISES, 1709 N. West, #103, Jackson MI 49202. RF299

TIGER TAIL - 2 meter HT range extender, $7.95. Info, $1. AntennasWest, Box 50062F, Provo UT 84605. RF300

WANTED: Pre-1980 microcomputers for museum collection. KK4WW. 703-231-6478, 703-763-3311. RF552

JUST IMAGINE YOUR OWN 25 TO 50 ACRE cool, green mountaintop QTH in the Blue Ridge Mountains, only $995 per acre. Wild game, great views, ideal for hamming, retirement or summer home. KK4WW, Floyd VA. 703-763-3311. RF553

WANTED: Yaesu FT-23R and Henry 5k or 8k linear amplifier. KK4WW, 703-763-3311/703-231-6478. RF554

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For prices and more information, contact *Susan Tracy WA6OCV, j•Com, Box 194, Ben Lomond CA 95005; (408) 335-9120, Fax: (408) 335-9121*, or Circle Reader Service No. 201.

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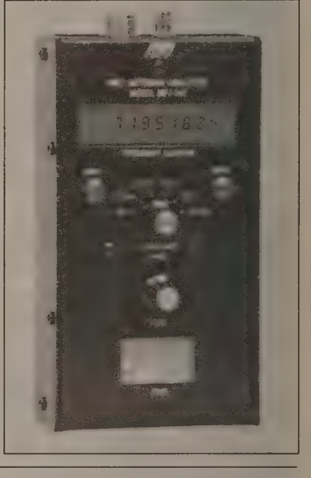

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Uncle Wayne's Bookshelf

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RF0592

Why CW?

(Continued from page 10.)

video screen, but can also be sent to a printer for a hard copy. The capability to print the message on paper is a very nice feature that is not available in voice mode. Of course, the packet mode of operation will transfer considerably more information in less time, but the CW mode of operation using the computer is entirely adequate for real-time conversational communication.

Fun

Perhaps the best reason that I can think of to run CW is that it is just plain fun. To me, the real excitement of ham radio comes from using finesse, rather than just brute force, to get a job done. I get a real charge out of slicing the IF bandwidth of my receiver down to a sliver and digging the "weak ones" out of the mud. To hold a QSO with a station half-way around the world using a little flea-powered CW rig that you made yourself is the real fun of ham radio.

I hope that this article has really imbued you with a better appreciation of CW, and that it has spurred your interest in using this fun and unique mode of operation. With an improved attitude, you should now find yourself better able to learn and use the code. Although I have now recently received my Advanced class license and can operate using SSB voice on all of the HF bands, I still enjoy operating CW. In the wee hours of the night, I can often be found tapping away somewhere in the middle of the CW portion of the band while my family sleeps in silence. RF

Contact Ken Gledhill N7TXG at 19503 Via de Arboles, Queen Creek AZ 84242.

letters Continued from page 5.

mass-produced items—NOT one-at-a-time pieces! (I think that it relates to the serviceability and long product life—people like technology that doesn't fight them.) Even my dad's ham gear has become unnecessarily complex. His new 2m/70cm transceiver looks like a screwball scientific calculator and has an instruction manual that needs a two-week course to go with it! (This machine is a far cry from his Drake TR-22C of some years back.)

The point? The capabilities of the technology are leaving us far behind. Technology has changed the rules. While the old-timers are busy playing with CW and fighting against a no-code license, those involved with the hobby are dying off. Soon, the bands will be taken away and few will be able to fight the situation. Amateur radio will become a casualty of progress. A ham license carries no weight in the job market—I have learned that the hard way. Nobody knows what it is anymore.

As far as hobbies go, I have found more excitement in building my own solid-state and tube hi-fi gear, restoring old guitar amps, collecting and playing guitars, working on old ('60s) cars, restoring old hi-fi and studio gear, making live recordings, and listening to lots of music. Amateur radio has become a fond memory of the past. Most (not all) hams I know today are little more than long-winded appliance operators. This is a sad commentary on people who were once on the cutting edge of technology.

I really wish I could offer input on what benefits the hobby could offer the public. I just don't know of any. It is sad to see the vacuum tube as having a better chance of survival than amateur radio.

The only chance amateur radio has is to grow with the technology: digital transmissions, HDTV, and even noncommercial broadcasting. Communications, experimentation and good ol' hard-core learning is the name of the game. We've just got to mix it with a megadose of FUN! (Not many of us got into it for the money!) We must change with the times. I used to wonder why people let their ham tickets lapse. Not only do I NOT wonder why anymore. I may just let mine lapse as well. There are better opportunities to learn about the new technology elsewhere.

(Bennett - In the same letter you have both complained about new, high-tech gear and insisted that amateur radio must grow with technology. You can't have it both ways. You have listed a couple of areas (HDTV, digital transmissions) where there is plenty of room for ham experimentation. Why don't YOU write up the articles that introduce us to these technologies – and tell us how to experiment with them on the ham bands. – N1GPH

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"Look at this new FT-530! Simultaneous receive on VHF and UHF, automatic "on" timer, 82 memory channels…"

"Yaesu did it again!'

Bright minds lead to brilliant "firsts."

That's right, brilliant innovative first-time ever features which make the FT-530 our most exciting HT addition.

Exclusive break-through features, too. Like flexible in-band dual receive. Not just V/U receive. With the FT-530 you can listen to two, 2-meter signals at the same time!

To keep you on the air longer, the Smart-TX℠ battery saver circuit automatically reduces power output when a full scale repeater signal is present. And we've added a voltage indicator and programmable battery saver for each band – a powerful, handful of exclusive features!

Another remarkable first is the Auto On-Timer℠. Here's how it works. Choose the hour you'd like the radio to begin operating. For example, set the time for the morning, then wake up to your favorite net. What's more, the built-in 24-hour clock displays the time when the radio is off.

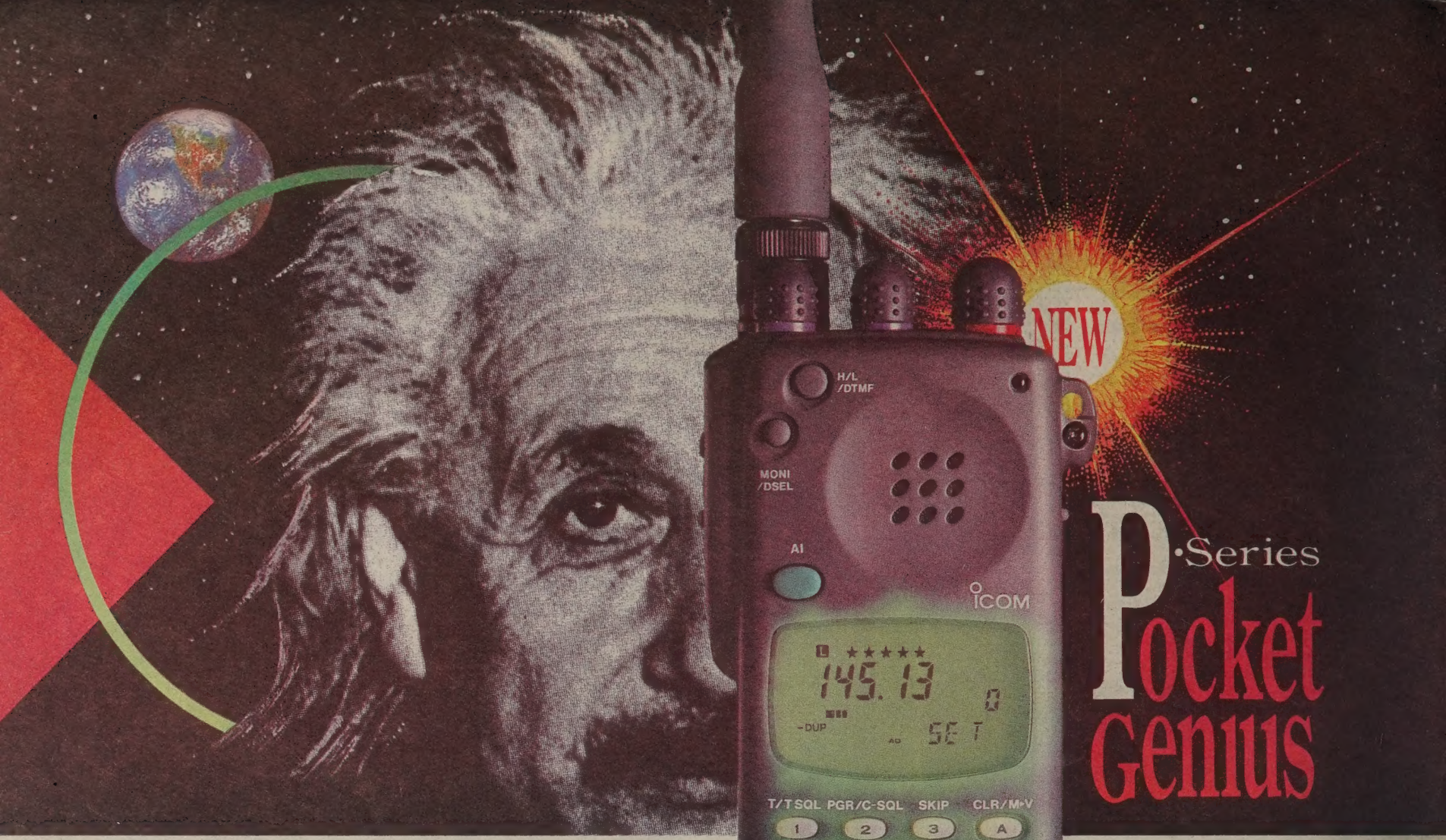
First out with 82 memory channels included, not an option; a real plus for storing all your favorite frequencies. With this HT, just open the box and QSO.

Be the first at your dealer's door to buy one, and the first to show off your new FT-530. What a bright idea!

YAESU

Performance without compromise.℠

Specifications subject to change without notice. Specifications guaranteed only within amateur bands. Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details.



Actual Size

The World's Smartest Handheld!

The Only Handheld With Artificial Intelligence

ICOM continues to lead the way in communications technology with the first "Smart Radio." Inside its super compact, futuristic body is a micro brain that offers programming, customizing, fun and games never before enjoyed in amateur radio!

The P-Series Pocket Genius actually asks you questions, determines your abilities and provides only the features you can handle. It is the perfect answer for making amateur radio simple and fun for new hams — yet in the hands of an experienced user, will prove to be the most advanced, full featured handheld in history!

The Most Full Featured Handheld Ever Built

ICOM has been listening to your suggestions and has responded with a handheld featuring everything you've ever wanted...and more: **100 Memories** - more than any other handheld. **16 Autodial Memories** - one touch of a button makes your call. **Illuminated Keypad and Display** allows nightime use. **Large Display** is easier to read. **DC Socket** for charging at home. Optional **DTMF Pager** lets anyone call your handheld with a 3-digit code. **Memory Skip** and **Mask** allows you to customize memories to be scanned.

P2AT 2 Meters, **P3AT** 220MHz, **P4AT** 440MHz.

New Hams in the Family

will appreciate the many easy-to-use features, small size and exciting question-and-answer games. They will have fun learning and advancing with the "Pocket Genius." And with autodial memories, they can have "911" emergency access at the touch of one button!

Be one of the first to experience amateur communications of the 21st century!

For more information, see your ICOM dealer or call the ICOM Brochure Hotline 1-800-999-9877.

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